PHILOSOPHICAL AND ETHICAL QUESTIONS CONCERNING TECHNOLOGY IN SPORT

THE CASE OF GENETIC MODIFICATION

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Abstract

This thesis investigates the use of sport technology to arrive at a coherent understanding of the ethical issues raised by genetic modification (GM) in sport. The approach draws upon methods in analytical philosophy, notably in the areas of applied philosophy and casuistic reasoning. Beginning with a conceptualisation of technology in sport, the thesis develops discussions about the socio-philosophical significance of sport technology. From here, the thesis derives a framework of *technological effects,* which is then placed into the context of three case-studies to clarify the moral content of the varying technological effects. From these examples, it is argued that ethical conclusions about technology in sport must be addressed to the particular case, rather than aspiring to a general theory about technology in sport. Genetic modification is argued as a particularly interesting case from which to understand the ethical and philosophical issues arising from the manner in which performance modification is evaluated in sport. It is argued that the use of genetics presents a significant challenge for the future of sports ethics and sport policy in relation to preserving sporting values, because it is unlike any other method of performance modification. A detailed consideration of the various ways in which genetics might be used in sport is then provided as a basis for framing the ethical discourse (encompassing genomics, somatic cell, germ-line cell, and pre-selection). The case-study is placed into the conceptual framework of *technological effects,* to establish how genetics give rises to ethical concerns. The analysis of genetics identifies the three concepts of: *sport*, *harm* and, *humanness* as the limiting parameters of the ethical discussions. From these, the concepts of *personhood*, *autonomy*, and *human dignity* serve to ground the ethical discussions in a rights-based approach to determining ethical conclusions about genetics in sport. It is concluded that sports ethics cannot remain secularised in respect of the genetics case and must be premised upon broader, bioethical arguments.

Keywords: *sport technology, genetic modification, bioethics, personhood, humanness, philosophy.*

1. Research Problem

In the past 25 years, research in philosophy has addressed the ways in which technology is augmenting human beings through technology, questioning whether this is for better or for worse. The birth of the first 'test-tube baby' in 1978 gave rise to a vast amount of re-theorising about medical ethics and discussion about the role of technology in society.[1] Concurrently, work within the *Journal of the Philosophy of Sport* began to address the problem of artificial performance enhancement, most notably in 1980 with the publication of W. Miller Brown's 'Ethics, Drugs, and Sport.'

The present approach is framed by this period and is concerned with understanding the ethical implications of performance altering technology in sport. The aim is to derive what are the valuable aspects of human sporting performance that can guide the formulation of ethical policies about the use of such innovations. The approach is distinct from previous research because it suggests that the ethical evaluation of such performance modifiers *must* derive from a broad conceptualisation of technology in sport rather than, say, a formulation about what is fair-play in sport. Previously, such normative notions as fair-play have governed the approach to understanding ethics in sport. In respect of technology, while some links have been made with doping, ethical inquiries tend to have departed from considering whether the innovations challenge fair-play, rather than from understanding the relationship between competitive sport and performance enhancement. For example, the doping issue in sports ethics has been addressed by an ethical investigation that departs from a weak conceptualisation of the nature of performance enhancement in sport. Arguably, a top-down ethical methodology has been overused in aspirations to arrive at a normative ethical theory of sport.

Consequently, the intention here will be to provide coherent arguments that make explicit the philosophical assumptions underpinning legitimate performance modifications and to question the ethical status of such innovations. The thesis intends to reveal the conceptual links between different kinds of performance modification, in

order to clarify why specific kinds are more desirable than others are. In so doing, it will develop an understanding about the ethical implications of performance-based sport, questioning its value. From here, the thesis will give an ethical evaluation of various kinds of performance modifier (herein described as *technology*) within elite competition in order to conclude the parameters of legitimacy. These arguments will be made in the context of a specific case, genetic modification (GM), where conclusions will be made about the ethics of modifying an athlete's genotype as a method of performance alteration. This issue is isolated for a variety of reasons, not least of which is the current controversy surrounding the issue in the last 3 years. Steadily, the international sporting community has begun to recognise that genetics could provide the next form of doping for athletes and, notably, the World Anti-Doping Agency (WADA) has taken an interest. This interest has become manifest recently in the form of an international meeting in New York hosted by WADA, titled "Genetic Enhancement and Sporting Performance (for notes, see Pound, 2002; WADA, 2002).

The problem facing anti-doping authorities is thus, how to address this technology and to decide its ethical status. It is argued here that, deriving the necessary ethical conclusions that will allow the formulation of good policy making in respect of genetic technologies, must depart from a conceptual framework about sport technology in general. Moreover, the initial approach of WADA to condemn all kinds of application is suggested as being unwise because it neglects the positive and valuable aspects of genetic research. The issue is controversial because it can be argued that there is a pervasive distrust of genetic technologies and an intuitive perception of such technologies as being comparable to drug-taking. Arguably, there is a perception that sport should be about the human being and not the *artificially enhanced* human being, which is how the genetically modified life is perceived. However, the way in which these two categories are defined presents some difficult epistemological problems about sport, technologies, and humans, which will be fleshed out throughout the thesis.

In order to reach a coherent and justifiable decision about the ethical status of genetic modification in sport, it is first necessary to understand the way in which the legitimacy of technology has been constructed within sport (Section 1). Subsequently, it will be

important to clarify and assert an ethical methodology that will be adopted for discussing genetics (Section 2). Next, it is necessary to derive a conceptual framework for understanding how to categorise the various methods of performance modifying technology in sport (Section 3). This conceptualisation will thus, provide the basis upon which to understand and distinguish between different kinds of performance modifier. Subsequently, a detailed explanation of GM and its applications to sport will be discussed (Section 4.1) to lead finally to an exploration of the ethical issues deriving from this technology (Section 4.2). The Conclusions (Section 5) aim to make sense of these competing implications in an endeavour to work towards a framework for the legitimisation or banning of the various applications of genetics in sport.

This interest in human-altering technologies in sport departs from Hoberman's *Mortal Engines* (1992), which has become a landmark in the socio-historical analysis of scientised sport. In many respects, the questions asked here derive from those that Hoberman sought to answer. Hoberman describes how a broad, social interest in the transgressing of human limits and the pathological obsession with measuring and quantifying human performances was immersed in an age of calibration, of which sport become a part.

Hoberman's work is important to understand how questions about technology in sports ethics have become important. As he describes, "it is the inseparability of sportive training from scientific ambition of our civilisation – not the availability of drugs that has produced the current crisis of high performance sport" (p.19). From this, Hoberman acknowledges that the use of technology in sport cannot be understood outside from the broader projects of society. Thus, at least in the context of technological progress, the kinds of approach to sport technology and value in sport, reflect the broader values of society. The present approach aims to arrive at coherent ethical premises about the value of such technology in sport. For this reason, it is necessary to avoid de-constructing sport, technology, and humanness from a social approach. Instead, it is to suggest that the crisis Hoberman mentions is a crisis in ordering *sporting values* and it is this aspect of technology - understanding its value in sport – that underpins the present investigation. Nevertheless, sociological discussions

about technology in sport can be claimed as predicative of needing to address the evaluative questions, as Hoberman suggests.

The scientisation of sport reveals the rational, philosophical underpinning of performance-based sport and it is this basis that Hoberman's work brings into question. These sentiments are echoed in Gibson (1993, p.2) who writes that,

> the root of the contemporary emphasis on results lies in the explosion of rationality and objectivity that characterises the Enlightenment. The power and achievement of the scientific method led to objectivity being seen as one of the hallmarks of truth. The criteria of reason and objectivity have been applied in a host of inappropriate situations and contexts ever since instrumental values dominated contemporary society and the value of things in themselves has become an outdated concept.

The 18th Century embodied individualistic, notions of surpassing limitations, and continual betterment which, as Brohm (1989, p.109) explains, are highly reflective of values within modern, elite sport,

> elitist sport is also deeply imbued with the idea of surpassing one's own limitations, which is an integral part of the positivist myth of 'progress': the myth of the indefinite progression of human performances, possibilities and productive capacity. 'Sport is a factor of advancement because its essence is a striving after performances and records: the will to surpass oneself, taken to the extreme

This perspective seems increasingly accurate as sport becomes further technologised. Brohm (1989, p.104) identifies that "'modern sport' appeared with the advent of large-scale industry during the period of the rise of English capitalism in the 18th and 19th centuries". It was a period in which the role of human beings in relation to labour and leisure was being redefined by the mechanisation of production, rendering the "champion a producer of performances and records" (*ibid*, p.105) where "his labour no longer belongs to him" (*ibid*). Moreover, one can conceive of the sportsperson as having become increasingly specialised, no longer having a sense of the broader praxis of sport. The athlete is trained very specifically for a particular kind of activity, sometimes even for a specific role within a specific sport. Far from being a more enriched, valued activity, Brohm (1989) argues that "the sportsman lives a narrow, compartmentalised

existence" (p.109) where "sportsmen are being turned into cybernetic robots" (*bid*, p.110).

The issues raised in *Mortal Engines*, beg the broader question about the ends of human existence and the degree to which human beings should be continually striving for enhancement. Hoberman presents the reader with a sense of 'sport gone wrong' (or, at least, going wrong), where the culture of doping is so rife that the role of the human being in sport is made nonsensical. The human being - Hoberman's *Mortal Engine* - is, as the metaphor and book title suggests, dehumanised, consisting solely of machinic qualities and capable of being engineered to provide a functional and entertaining performance. However, the rub is that Hoberman's metaphor provides only a partial account of this sporting paradox. While it is accepted that sport without humans is not particularly interesting, the desire to witness an extraordinary performance is also acknowledged – there is an aspiration for athletes to be superhuman. It is this tension between humanness and seeking to be super-human that presents the conflict in values about sport and, it is suggested, that presents the challenge to negotiate sporting values. Consequently, the central problem of this issue is establishing what are the aspects of sport that give it value and how technology corresponds to, or conflicts with these ideas. It is intended that the conclusions will provide some basis for formulating a more rigorous and coherent policy about the ethical suitability of performance modifications in sport, by isolating central and important values.

As Hoberman (1992) explains, the guidelines within sport that distinguish between legitimate and illegitimate methods of performance enhancement are insufficient. Hoberman makes this argument with reference to a comparison between hormonal substances and fibre-glass poles used by pole-vaulters, asking about their conceptual differences that make one acceptable and the other morally repugnant. This example captures the primary task of the thesis, which will be to clarify the differences between various kinds of performance enhancing technology in a way that goes beyond the simple drug-taking and doping categorisation. Perhaps a more recent example that serves to reveal the inadequacy of this categorisation is the 'altitude tent.' Such technology creates an artificial climate, which allows an athlete to acclimatise to a higher

altitude and enhance their performance, while remaining in a low altitude location. Understanding how this example of technology in sport fits within the general discourse of what is acceptable or not, is the basis for arguing why ethical conclusions about performance modifiers in sport must derive from a coherent conceptualisation of technology in sport.

In the philosophy of sport, this subject has been problematised in relationship to performance enhancements mostly in the context of drug use. Yet, questions surrounding what constitutes legitimate performance extend beyond performance enhancement. During the 1980s, drug-use in sport received a great deal of publicity and criticism, notably in the case of Ben Johnson at the 1988 Seoul Olympic Games. Subsequent to winning the 100m Gold medal in an extraordinary performance, Johnson's achievement would, overnight, be tarnished by the announcement of a positive test result for the anabolic steroid, stanozolol.[2] Yet, before the Johnson scandals, the 1980 Moscow Olympic Games, Houlihan (1999) explains, revealed that international sport was saturated in a culture of drug use (*bid*). By the time Ben Johnson won the 100m sprint in 1988, the use of anabolic steroids was, indeed, clearly prevalent. However, athletes were becoming increasingly sophisticated in their use of drugs, experimenting with human growth hormone (hGH) and recombinant erythropoietin (rEPO), which were (and for the latter, still are) impossible to detect.

In the context of these varied substances, the philosophy of sport literature has continually problemsatised the ethical status of doping and drug taking, by contrasting them with an alleged ethical character of sport. Typically, there seems to be the intuitive assumption that drug-taking and doping are wrong and that it is cheating in sport to use such methods of performance enhancement. From this initial claim, sport philosophy has constructed elaborate arguments about what constitutes cheating, relating ideas to broader philosophical debates about meaning and value for human beings. Indeed, it is important to recognise that the drugs issue remains controversial and a high priority for international sport. Most recently, International Olympic Committee (IOC) President, Jacques Rogge, has identified doping as *the* priority for international sport (International Herald Tribune, 2001).

As well, there continues to be a strong contingent of anti-doping supporters, who consider that drug use and other methods of doping are morally questionable and ought not be an accepted part of sport. Importantly, such campaigns are integral to the interests of many important organisations, such as the European Union, the Council of Europe, and the United Nations, whose work in relation to social improvement explicitly overlaps with issues about drugs in sport (Houlihan, 1999). Yet, some ethicists are not convinced that the arguments against drug use in sport justify the infringement of individual liberties imposed by anti-doping rules. Rather, a fundamental inconsistency in the logic of sport rests with the position that advocates the total removal of drugs and other ergogenic aids from competition, while accepting other kinds of performance enhancement, such as new tennis racquets.

Beyond these ideas about the use of substances and doping methods in sport, there have been limited writings about other kinds of performance enhancement. Sporadically, articles have included examples of other kinds of performance enhancement as a means to identifying that there are inconsistencies in the acceptance of conceptually similar ergogenic aids. For example, Gardner (1989) considers the broader concept of performance enhancement, utilising examples such as the U-groove golf clubs that were designed to increase the spin rate of the golf ball and thus, to allow greater control. Similarly, Parry (1987) introduces the examples of how fibre-glass poles in pole vaulting and hi-tech bicycles are ethically acceptable technologies in sport, though they are conceptually similar to drug use, which is considered unacceptable. Parry also uses such examples to conclude that sport *is* interested in performance enhancement. Thus, to ban drugs on the basis of them enhancing performance would seem to be contradictory.

However, neither of these examples, nor others from Bjerklie (1993), Gelberg (1998), Carr (1995), Haper (1985), Hummel and Foster (1986), and Rintala (1995), provide a comprehensive conceptualisation of these kinds of performance enhancement and their legitimacy. This is surprising given the proliferation of performance enhancing technologies that exist in sports. Today, sport is undoubtedly a technological endeavour – if, indeed, it ever has not been. The number of examples of technological innovation

that have made international news, because of the controversy they have raised, is extensive. Most recently, the list includes the use of bigger tennis balls within professional men's tennis (Miah, 2000c), Speedo's Fast-skin full-body swimming costume (Magdalinski, 2000), and the use of genetic technologies to reduce injury time or increase endurance capabilities (Miah, 2000b; Miah, 2001a, Munthe, 2000). From these few examples, it can be seen how sports embody an ambiguity about how they use technology and how they embrace new performance enhancement in some respects, but not others. It is not clear whether technology is making for a more exciting valuable practice or whether it is removing or lessening aspects of sport that are integral to its value and it is precisely this ambiguity that gives rise to the ethical uncertainty.

At the end of *Mortal Engines*, Hoberman describes the possibility of genetically engineering athletes or breeding them as one might breed racehorses. This, Hoberman suggests, would be entirely congruent with the logic of elite sport and would seem to be the most efficient means of achieving the super-athletes that elite sports seem to demand. This is not the first time such prophecies of super-athletes have arisen within academic literature. Perhaps one of the first identifications of modern sports as tending towards the technologically absurd is from Johnson (1976), who suggests that technology will become increasingly dominant in sports at the expense of the human being. Johnson explains a number of fantastical ideas about the future of sport that are increasingly conceivable as greater sophistication in the technology available for sports is achieved. Johnson (*ibid*, p.226) describes how,

> drugs will be sold openly at sporting-event concessions...hot dog of tomorrow will pack the same kick as the marijuana brownie of today...there will be only one discussion in boxing, the heavyweight, all others having vanished because of boredom or bankruptcy...ski boots will have sensors that release the binding if the stress on a leg bone approaches the breaking point...non-contact sports will be played in the nude...a round of golf will be played on one spot, by means of a computer and TV screen; and that ice hockey will be played on Teflon

Admittedly, it is easy to be critical of any speculations and one ought not attribute any academic rigour to such claims. However, it is extraordinary to recognise that these

prophecies were made 25 years ago and are somewhat reflective of present-day sport. Johnson (*ibid*, pp.227-228) describes how,

> sport will continue to reflect the society in which it occurs....hockey and football will be more violent in the year 2000 because we may be such a sedentary society that we need some release for our emotions

Interestingly, within Johnson's argument he suggests that technological "developments are likely to get piled upon one another, which will decrease the role of the human being" (p.230). Moreover, it is suggested that "ridiculously super-fit athletes will occur as a result of random mating in an increasing population to bring together diversified genes, plus better nutrition and the absence of childhood diseases" (p.231). Again, it is reasonable to accept that Johnson had some foresight about the tendencies of elite sport. Yet, the tension is still present in that these versions of sport are only partially desirable. Indeed, these specific depictions do not seem desirable at all, yet they certainly do respond to the performance-based model of sport.

Within the context of this theoretical background, it will be shown how ethical arguments about performance modification are underpinned by a rationalisation about technology that pervades elite sport. This will be achieved by drawing upon perspectives in the philosophy of technology, which respond to the lack of clarity about technology in the sport philosophy literature. Subsequently, the ethical analysis will engage with ethics in sport and in medicine (biomedical ethics) arguing that neither one of these perspectives alone is sufficient to make any useful conclusions about the ethical status of genetic modification in sport.

2. Theoretical and Methodological Premises

The methodological approach derives from applied philosophy, which is grounded in issues of urgent and practical importance. Thus, it is argued that in the world of sport, the ethical concern about performance alteration is one such example of an urgent philosophical issue that requires attention in order to inform governmental decisions and the judicial system. As well, applied philosophical issues are characterised by the need for there to be some difficult decision to be made. Thus, in the context of the present inquiry, it is recognised that governing bodies of sport must respond to the realities of new technological enhancements that might be used in sport. A policy must be produced that asserts some moral conclusion about whether the innovation is acceptable or not.

Applied ethics, which will form the basis of the main discussion and conclusions of this thesis, has emerged out of a trend to prioritise specific kinds of ethical issues as having substantial social significance. The perspective of applied philosophy adopted here is not, however, to be seen as separate from applied ethics. Rather, it is simply that, for applied philosophy, the concern is wider than the ethical issues. Because the present approach seeks to understand epistemological issues in sport that relate to the main ethical inquiry, applied philosophy is a more accurate reflection of the approach.

To answer questions about the ethical status of technology in sport and the way in which governing bodies can derive ethically informed policy about genetics, an investigation is required into what constitutes performance enhancement. It is necessary to begin with a philosophical inquiry into the meanings and forms of performance enhancement or, more succinctly, to understand what they are. Such an approach fits with Kretchmar's (1998, p.20) re-statement of the need for metaphysical inquiry to underpin ethical deliberations. As he claims,

> To separate 'is' conditions (e.g. what sport is) from 'ought' recommendations (e.g. how athletes ought to act in sport) is to sever ties with important sources of

> information. It is to try to behave ethically *in vacuo* and thereby to court moral confusion.

Kretchmar's perspective draws upon traditions in analytical philosophy, which, Williams (1985) argues, "involves argument, distinctions, and, so far as it remembers to try to achieve it and succeeds, moderately plain speech" (p.vi). This clarification of concepts and the relentless 'peeling back' of meanings and terms is something attributed more to essentialist approaches of understanding philosophy. Moreover, such approaches are critiqued for not being useful to make clear demarcations between the analysis of concepts and the ethical evaluation of them within specific contexts. As such, this metaphysical inquiry is sometimes not seen as an important aspect of ethical inquiry. Nevertheless, the literature in relation to performance modification in sport would seem to lack such clarity of terms. There has been no thorough conceptualisation of the various technologies in sport as there was, say, in relation to distinguishing sport from other forms of activity, such as play and games. The early work in sport philosophy by Suits (1973) and McBride (1979), recently resurrected by Schneider (2001), which tackled such issues, has become seminal in the discipline, serving to inform many papers about ethics in sport. Such utility, seems to provide some justification for the value of metaphysical inquiry into defining performance modification. Consequently, the argument will proceed to do so, indicating where it becomes problematic and where it could be useful to consider a specific ethical analysis.

Importantly, the perspective of analytic philosophy does not dismiss oriental or continental philosophical approaches to philosophical inquiry. Rather, championing the sanctity of reason and rationality, it asks for a justification of their approach, which, from their perspectives, is its flaw. The critique of this might require some discussion about the place of rationality and reason within philosophy and, indeed, the need for justification. It might require, so to speak, justifying why justification is necessary, as has been done by philosophers such as Mackie (1977), or to question the sanctity of reason in philosophical (and particularly moral) debates. Any such clarification will not be attempted here since to doing so would distract far from the interest of this thesis. Nevertheless, these are important meta-philosophical issues that must be addressed.

This initial philosophical inquiry into technology and sport (Section 3) will serve as a basis for the ethical analysis for which it is, again, necessary to rationalise the chosen ethical methodology. Thus, to arrive at a useful ethical perspective to this thesis, it is necessary to give a brief overview of the ways in which it is possible to approach ethical questions. It might not be necessary to provide justifications for the methodology in the context of other approaches to ethics. For example, despite their vast differences, it is not considered necessary to justify the adoption of a consequentialist ethical approach in favour of a deontological methodology.[3]

However, in order for the methodology to be defensible and understood, it seems useful to make the distinctions and decisions clear. An explanation and rationalisation of the ethical approach is also necessary as there are a number of ways in which one can 'do' ethics. Thus, some attention must be given to provide a critical approach to ethics and give an overview explaining different approaches. Subsequently, the methodology will conclude with a rationale for adopting the chosen ethical framework for the thesis.

It is important to note how this approach differs from, say, a sociological, or an historical analysis of the genetics issue in sport. Indeed, it could be worthwhile to track the historical antecedents that might provide a better awareness for understanding why genetics is such an important issue and why it is seen as largely dystopic in the media. However, the present approach is guided by critiquing questions of value and asking for their justification. Abstracting from the social or historical context, the questions posed are about whether genetic modification has value in sport, when considered alongside ideas about what gives sport value.[4]

A common criticism of the value of ethical research derives from a perspective of social or natural sciences, which might argue that ethical choices are socially constructed. Such arguments attack the value of seeking objective ethical choices and thus, see any inquiry into establishing right and wrong as a fruitless pursuit. From this approach, the only truths that can be sought are non-generalisable local truths that are reflective of what is right for a given culture (Simon, 1991). Such a conclusion is premised upon

recognising that there are no absolute philosophical truths, or moral ones and would appear to reject the need for philosophical inquiry. As a response, this very statement makes an assumption that is itself philosophical, which would seem paradoxical. It does not seem possible to refute the value of philosophy with an argument that is, itself, philosophical. For an ethical discourse, a similar argument can be made. It is acceptable to adopt a relativistic position about the nature of ethical decisions. Accepting its truth, however, is to reject only one aspect of ethics – that it is possible to derive universal truths about right and wrong.

Beyond this, the ethicist can inquire into the construction of relativistic morality. Again, the ethical relativist or anti-theorist (Jamieson, 1993) might argue that notions of right and wrong derive from tradition, habit, inherited, and socially evolved norms. In so doing, the aim of the ethical relativist is to reject the value of ethical inquiry. This response entails the assertion that, if discerning right from wrong is the aspiration, then it is necessary to examine the values within a community and observe how they evolve, rather than to subject them to some ethical analysis to establish whether they are true. The ethical relativist would argue that such empirical findings are the only source of conclusion and that no more can be said about morality than that which is discovered within the culture.

Yet, ethical inquiry can ask a further question about *first principles* (defining what is 'good' or 'right') and to inquire about the possibilities of communities to evolve, morally speaking. Accepting that various communities derive their values from inherited notions of right and wrong does not preclude these notions from evolving or being challenged. As such, it is the manner in which this takes place that directs the ethical inquiry. Thus, the evolution of morality must take place in some context, which, from the ethicist's perspective, must entail an ethical discourse of some kind. For example, the existence of an ideal legal system, derives from a highly complex system of establishing what is right, wrong, just and unjust. So, the moral norm of it being unacceptable to violate individual human rights departs from a philosophical premise about the value of rights and human life. This premise is one that finds its roots within philosophy and ethics and its evolution depends upon philosophical and ethical

discourses that seek to refine ideas about the right and the good, through problematising their application within society.

This suggests that there is, indeed, a case for conducting ethical inquiry, even if one rejects the value of meta-ethical inquiry. A further point to make in response to the ethical relativist is to stress that the discussion is misconceived if it is presumed that these are oppositional epistemological assumptions. However, for the ethical relativist, it is important to recognise that ethical discourse has value precisely because it is possible to reflect upon values and to seek their justification within a given philosophical framework. People do not accept any version of right and wrong and better and worse arguments can be provided for adopting a particular kind of practice within social practices.

The final point to contest, and which might appear the last resort of the ethical relativist, relates to the relevance of specific kinds of ethical inquiry. One approach given by the ethical relativist (although this is not exclusive to them) is to argue that, while there might be some grounds for accepting the above arguments, research is at a point where ethical inquiry is no longer necessary. Along these lines, the argument is made that the values deemed to be of importance have already been derived. As such, there is no need for ethical inquiry anymore. For example, scientific research is premised upon the established principles of medical ethics and that is all that is necessary for now. Thus, all research governing human subjects is guided by concise and unchanging ethical principles: autonomy, beneficence, non-maleficience, and justice (Beauchamp & Childress, 1994). It would seem that science is relatively content with these guiding principles and they inform many ethical codes of conduct in research. Yet, such principles are not beyond scrutiny and are, in fact, often found to be insufficient to serve as a guide for good practice in medical research. Thus, it is the questioning of such principles that is taken for granted by much scientific inquiry that reflects the value of ethical analysis in the present study.[5]

From these conclusions, a further distinction must be made between the meta-ethical and normative ethical methods of inquiry. The former (meta-ethics) asks questions

about the nature and methodology of making moral judgements. It studies the meaning of such terms as 'good' or 'right', questioning the degree to which it is possible to arrive at moral truths through ethical investigation. From such methods, one might begin by questioning what constitutes the content of ethical questions and ask upon what basis one can suppose that ethical questions are unique or anything more than subjective expressions of preferences or intuitive approval. Alternatively, normative ethics is traditionally phrased as being an inquiry into deriving principles that delimit 'how one ought to live'.

However, normative ethics can also be separated into two further sections: normative theory and applied ethics. The former seeks to derive general moral principles, whereas the latter studies moral questions about specific areas and places moral principles into an applied context. In contrast to applied ethics, practical ethics places more emphasis upon the context, adopting a bottom-up approach where moral principles – if any are possible – are derived from the particular case examples. Thus, it does not neglect the practical implications of ethical decisions and endeavours to base pragmatic decisions within an ethically informed framework. Nevertheless, the imperative is upon utility for the particular and special contexts within which the decisions must be made and to arrive at workable conclusions that can be implemented. It is, perhaps, accurate to say that practical ethics, on this view at least, is concerned more with what works rather than what should be the case. However, its tacit rejection of moral principles does not prevent practical ethics from utilising such principles to guide and develop ethical conclusions. Consequently, it can be a useful tool with which to address specific ethical dilemmas.

Through the specific use of casuistry, an applied ethical approach will be utilised in the current thesis. The use of casuistry – quite literally the study of cases – departs from the claim that moral conclusions must derive from individual cases. For example, in relation to the principles guiding medical ethics, casuistry would find weakness in deriving such moral rules from some abstract moral standpoint. Rather, casuistry examines the specific context of medical practices where ethical conflicts arise, to derive tentative guidelines from such contexts.

One criticism of casuistry is that the approach departs from mid-level principles. Thus, it argues that, if X is valued, then Y ought to be valued (Rachels, 1998). However, it does not interrogate whether X should be valued in the first place. Indeed, such a view suggests that the inquiry departs from a basis that leads simply to 'question begging', as to what kinds of values should be held at all. Yet, pursuing first principles would abstract considerably from the context under discussion here. Therefore, a balance is sought between deriving ethical norms from the applied context, and placing these against currently held values so as to bring into question such guiding norms. By engaging with relevant normative principles, it is intended that the basis for such criticism will be weakened.

Importantly, with casuistry, there is no expectation that the conclusions can be generalised. Rather, their specific conclusions provide a more coherent basis from which further inquiry can take place. Yet, there is no assumption that this must lead to a workable set of principles that can be utilised in all situations. Consequently, the approach is one that recognises ethical inquiry to be an ongoing process and certainly not something that can precede action with a view to deriving rules that make redundant the need for further ethical inquiry.

The appropriateness of casuistry for the present ethical inquiry is reflected in the disciplines that inform the discussion, namely: philosophy of sport, philosophy of technology, and the philosophy of medicine (also termed as bioethics). These areas of philosophy have their roots in modern trends and are relatively new fields of study – though, not surprisingly, the issues they consider are imbued with philosophical ideas of some centuries. Moreover, it can be argued that each of them has an interest primarily in doing applied or practical ethics. For each of the disciplines, their academic study has evolved out of practices where ethical issues have arisen and raised the need for deliberation. As well, each has gone through a similar process of epistemological definition.

One of the main ethical considerations within sport has been to seek answers about what kinds of performance enhancement are ethically justifiable and what constitutes good sporting practice. Such questions have been placed into specific applied contexts rather than limited to abstract conceptual investigations. Thus, ethical inquiries have been recognised by sport philosophers as best understood when placed into concrete examples, such as the moral status of animals by considering hunting (Wade, 1990; 1996), or the morality of harm and individual liberty by considering the status of boxing (Davis, 1993/4). Such discussions have revealed that a theoretical approach to understanding ethics is not sufficient to provide ethical conclusions, so they must be used to accompany more applied debates.

In this capacity, sports ethics is not dissimilar from bioethical inquiries, which also adopt an applied approach to doing ethics – particularly within the last decade. Indeed, Rachels (1998) provides some recognition about the approach, strengths, and weaknesses of bioethics, which can be conceived as being comparable to sports ethics. Through an inquiry into the place of ethical theory within bioethics, Rachels argues that the *straightforward application model*, whereby one applies ethical theory to the context, is rejected within bioethics. Thus, applying the theory of utilitarianism to a moral situation in bioethics (and, by suggestion here, sport) is not sufficient to provide answers about what moral conclusion must be reached. For example, one significant issue in bioethics most recently has been the cloning of human stell-cells – the cells that provide the building blocks for life. From a utilitarian perspective, one might simply endeavour to evaluate the harms and the benefits to derive a moral conclusion. From one perspective, such techniques could (and it is important to recognise the probability of success in making the evaluation) allow infertile couples to conceive a child, which would seem desirable. However, it might also be argued that the process of natural selection dictates that some members of a species must be unable to procreate to ensure the survivability of the species, which could be a negative consequence of cloning.

Utilitarianism would have to find someway of ascribing a quantitative value to these differing effects, with a view to concluding which is preferable (that which maximises the greatest good). However, Rachels would argue that the situations, about which the

ethical conclusion should be applied, are far too complex for such a straightforward utilitarian approach. The degree of detail and complexity of the case of stem-cell cloning cannot possibly be reduced to a quantitative analysis of harms and benefits to allow concluding what is the right decision regarding its legality. The theoretical premises underlying this thesis, in respect of technology, adopt a similar perspective. It is necessary for the normative rules to emerge from the detailed consideration of cases in sport, which reveal the ethical conflicts and varying values.[6]

A case study approach to ethics provides a method by which ethicists can begin with mid-level principles to determine ethical conclusions. Again, this is recognised as problematic since, to reinforce the foundationalist argument, one can reasonably expect these mid-level principles to have derived from some higher level principle. Thus, Rachels considers that "the mid-level principles alone cannot provide definitive answers to the question of what we should do" (p.18). Instead, such an approach reveals what one should do if one values X or Y. Nevertheless, casuistry, Rachels suggests, can help to identify intuitive principles that influence moral evaluations. Still, however, there is doubt about the value of ethical theory, as it does not provide a basis for choosing between competing theories.

Again, the approach taken here reflects Rachels' thesis, which is to recognise that beginning with mid-level principles does not prevent one from approaching a more accurate reflection of values. It is not necessary that one approaches understanding right and wrong from mid-level principles alone, but instead subject these principles to critical reflection in an endeavour to approach a more representative theory. Thus, Rachels concludes that there are grounds for dialogue between vastly different cultures that can enable the recognition of shared values. The example used by Rachels is slavery, where he poses the question of whether there is any argument against slavery that must be acknowledged by every reasonable person, regardless of tradition. Rachels' aim here is to demonstrate that, even if a community considers that a specific value is understandable (and acceptable) only within its culture, that it is possible that this value can be subjected to questioning that can reveal its unacceptability as a moral criterion. From this example, Rachels (*ibid*, p.21) writes,

> all forms of slavery involve treating some people differently from rest, depriving them of liberty and subjecting them to a host of evils. But is it unjust to set some people apart for different treatment unless there is something about them that justifies setting them apart - unless, that is, there is a *relevant difference* between them and others. But there are no such differences between humans that could justify setting some of them apart as slaves; therefore slavery is unjust.

Thus, Rachels considers it possible to identify the assumptions within philosophical and ethical positions and deliberate their acceptability. In this, Rachels identifies that Aristotle considered slavery defensible since he considered that slaves possess an inferior degree of rationality. However, Rachels notes, such an assumption is demonstrably false.

The study of bioethical issues demonstrates similar methodological assumptions, most evident in the applied ethical discussions of such issues as, for example, euthanasia, abortion, or cloning. The way in which these issues are now approached demands more detail about the contexts under discussion. They do not rely on the clarification of abstract principles to make conclusions. Instead, they seek to derive normative guidelines based upon currently held values. As such, bioethics has encountered a significant change from the earlier works that have investigated the abstract philosophical questions of, for example, the moral status of human embryos (Warnock, 1987), or the ethical concerns about making an individual's genetic heritage public knowledge (Knoppers, 1999).

This has led to bioethicists being concerned, increasingly, with contextual issues that are highly specific and which do not seek generalisation. While its roots are within principle-based ethical approaches that guide medical practices (Beauchamp and Childress, 1994), this has evolved into a more casuistic methodology. This is not to say that bioethics does not 'hang together' as an ethical discourse, as is often the criticism of casuistry. Rather, these applied ethical debates inform the abstract ideas as well. Additionally, the abstractions are grounded in the use of examples and do not pretend that it is possible to separate the concepts from the contexts.

The ethical approaches taken in sports ethics and bioethics are useful companions in this regard as sports ethics has also proceeded through a process of theoretical definition in its ethical approach. Sports ethics literature recognises the value of an applied normative ethical approach, beginning with such notions as 'fair play' and proceeding to give their abstract conception some content and practical value. As well, the range of cases in sport – even within the doping issue alone – have given rise to ethical arguments being directed to specific substances (for example, Verokken, 2001).

Finally, it is distinct about applied ethics that there is an interest in arriving at conclusions that can inform the formulation of policy in the given area. Indeed, applied ethics is considered by some as inextricable from professional ethics and the forming of codes of conduct. Similarly, the present investigation will endeavour to provide an ethical foundation for the development of policy about genetic technologies in sport that has immediate utility for international sporting authorities.

3. Conceptualising Methods of Performance Modification

With the methodological approach in mind, it must now be questioned how it is possible to make sense of new innovations in sport. How does one begin even to conceptualise and make categorisations of different innovation? One might be tempted to adopt an essentialist approach, whereby one could employ something like Wittgenstein's (1953) family resemblance theory or even Suits (1973) and McBride's (1973) approach to clarifying the nature of sport and games. Indeed, Steenbergen and Tamboer (1998) deem such an approach as essential to allow for good ethical investigations. However, the present interest is less to define sports than to understand how performance modification is used within them. Thus, any such conceptualisation, at least initially, is best utilised to understand the relationship of sport and technology rather than of sport in isolation. As well, a solely definitional approach does not allow an understanding of the *intended meanings* of a technology within specific contexts. Such an approach appeals to absolutism and the possibility of objective truths in the explanation of meanings, which in this context, is not considered to be of value or a fruitful investigation.

It is surprising that a conceptualisation of technology in sport has not really taken place within the sport philosophy literature or, indeed, anywhere, since technological change has been present within sport in various forms since its very inception. Its presence has been brought into very discrete and controversial topics, such as the use of new fibre-glass poles or new golf clubs. However, the theoretical analysis of these examples has not sought to understand how technology functions within sports and what ethical problems it might raise. As such, the sport philosophy literature can be of limited use here. The considerations of technology in sport, as will be detailed further below, tend more to be in understanding technology as a discrete entity than as part of an enduring characteristic with special attributes.

Nevertheless, where authors have recognised the ethical content of technology in sport, the conclusions and conceptualisations have been useful and provide a point of departure. Thus, for example, Simon (1991) describes technology as something that can change the nature of an activity and its intended test, or how it can remove a defect that is evident in previous designs of equipment. As well, it is acknowledged how technology can make a sport easier for the participant as is the case for lighter tennis rackets, kneepads in volleyball, or toe-caps on bicycle pedals.

Other examples of a similar nature abound within the philosophy of sport literature, where technology is understood and used as an example to reveal inconsistencies in seemingly more pressing issues, such as doping. Thus, in questioning the legitimacy of doping, authors have used the acceptance of new technological equipment as a basis for arguing that ethical rejection of doping is inconsistent and hypocritical, if it intends to reflect a cogent sports ethical standpoint. From such a perspective, it is argued as insufficient that drugs should be banned for sporting reasons, since if they were, then these other technologies would also be unacceptable.

Despite these reasons to support the utility of sport philosophy to inform the discussion about technology in general, a broader consideration of technology is required to conceptualise sport technology. Two central and initial questions arise within a philosophical inquiry about technology. Initially, it must be questioned exactly how one goes about understanding technology. Second, it is necessary to provide some limitation about what counts as an example of technology. Together, these investigations can give substance to the rather abstract question 'what is technology?' Moreover, they provide a richer understanding of the kinds of question that will be asked about sport when inquiring into the ethical status of technology. This analysis will help to clarify what it is about sports that are of value by informing the discussion with clearer ideas about how technology can challenge the ethical character of sport. By understanding more about what is technology and its boundaries of application, it will be clearer what kinds of examples of sport technology are of concern.

As such, the following section will provide an articulation of how technology can be understood and will make sense of classifications in sport. It will argue that technology must be understood in terms of its actual effects within practice. Moreover, it will be suggested, along with Tiles and Oberdiek (1995), that its moral content is found in its application, which is necessarily its context of understanding. Thus, it is argued that technology is not morally neutral and it is unavoidably applied in a socially biased context.

3.1 The Importance of Efficiency

Two main strands of understanding technology can be identified within philosophy broadly and, more specifically, in the philosophy of technology literature. The first view can be considered the *traditional* view of technology, which departs from the work of Aristotle, who argues the need to ask four questions about technology: what is it? What is it made for? Who/what made it? What is its purpose? These four causes; formal, material, efficient, and final, are considered as a framework for understanding the implications of technology (Cardwell, 1994). In recent times, Heidegger (1977) and social theorist, Jacques Ellul (1964, 1983), take up ideas about technology. However, such approaches depart from Aristotelian ideas and can be argued as opposing Aristotle's initial formulations in one important respect: Aristotle argues technology as purposive, goal-directed and morally neutral; the latter theorists do not. Aristotle's approach removes technology from its context. In contrast, Heidegger and Ellul consider that Aristotle's approach to analysing technology outside of its applied context is logically incoherent – the technology and its context cannot and should not be considered separately.

The ideas of Aristotle are reflected within the philosophy of technology literature by Hood (1983), who argues that "technology is a human arrangement of technics – tools, machines, instruments, materials, sciences, and personnel – to make possible and serve the attainment of human ends" (p.347). Thus, Hood views technology as a means-end activity; technology is not an end in itself, but a means to the realisation of some other,

valued end. In this capacity, technology is understood as lacking in moral content, which suggests that it does not raise moral issues.

Nevertheless, it can be argued that technologies *do* gain moral content in their application. The point might seem trivial since the immediate response might be that technology necessarily has an applied context and that, therefore, the Aristotelian approach is clearly bunk. Indeed, it is not sensible to talk of the television or the automobile outside of the social context within which they are applied. Thus, one initial response to this articulation (and an indication of later critiques) is the argument that technologies are necessarily located and to discuss their moral neutrality is but a trivial point. Indeed, the thesis continues by asserting that,

> use is not an end in itself, its final purpose is the same as that of all human action – namely the maintenance of human life and its perfection in which man attains *eudaemonia*, his supreme happiness....To achieve human perfection man needs to cultivate not just technology, that habits and know-how which make up productive cognition, but a life that transcends mere making (Hood, 1983, p.351).

Thus, the Aristotelian ideas describe technology as morally neutral, but recognise technology as being integral to human aspirations, which give it moral content and an ideological underpinning. However, this very point leads toward the Heideggerian articulation of technology as fundamentally value laden. On this view, "it no longer makes sense to maintain that technology is a neutral instrument which, for better or for worse, serves man" (Hood, 1983, p.352) since it cannot be separated from its application. Heidegger's view proceeds from recognising technology as being grounded in human 'being' or *Dasein*, which refers to the basic connection between human existence and Being to indicate that a human's very own existence is what is proper to him/her, and what distinguishes it from all other entities. Thus, Heidegger (1977, p.352) writes, "what is basic to man [*sic*] is the fact that he is always in a world." Indeed, the stronger claim is made by Hood (*ibid*, p.354) that the,

> meaning of technology is not that it makes possible the execution and satisfaction of human needs, or that it is instrumental (both of which are true), but that it reflects the concern man has for the Being of entities. Thus technology is ontologically possible because his concern grounds it.

These arguments conclude persuasively that technology is best understood as being value laden, because it is necessarily applied within a human context. Whilst its abstract conceptualisation might be value neutral, it is not sensible or useful to think of technology in this way. Moreover, the notion of technology being comprehensible as a means-end entity, about which it is necessary to understand only its purpose, is misleading. Indeed, the role of efficiency here is ambiguous, though needs highlighting for its implicit and explicit implications for understanding both technology and sport literature.

In relation to sport, it could be argued that elite athletes seek an efficient and technological performance in an Aristotelian sense - the technology is designed as a means towards a given end (to enhance performance). However, it must be questioned whether this view is accurate and whether it implies the rejection of Heidegger's and Ellul's ideas. It is not sufficient to understand technology as a means-end oriented enterprise (efficiency driven), while at the same time argue that it is important to examine the effects of technology (understanding technology as ends-based).

To help reconcile this tension, classical techno-theorist Langdon Winner (1986) argues that it is difficult to neglect the role of efficiency in the design of technology. It is less relevant whether the technology is effective in its design and thus, whether it makes the activity more efficient, than it is that technologies are designed with an *intention* to improve efficiency. As well, Winner stresses the political content of technology challenging the efficiency-based approach to understanding technology as reductionism. However, it is not clear how this helps in the question of technology in sport. It still remains unclear what is the subject of discussion when considering sport technology. Aristotle suggests examining the *purpose* of the technology - what does it intend to do? Alternatively, Heidegger suggests that it is necessary to examine its implications to *challenge or redefine concepts of what it means to be human*.

Neither of these views seems helpful at this stage. Not only are they contradictory, but they also both seem intuitively plausible. It can be recognised that technologies are

purposive, but also that such purpose is located in human intentions. As well, it is not clear how Aristotle or Heidegger can help the discussion in a sporting context. Aristotle would argue that it is necessary to examine the purpose of the technology. Heidegger would argue that the conceptualisation must begin from the point of understanding how the technologies alter the meaning of humanness.

Perhaps, then, the two perspectives are not so oppositional. There seem very clear differences in understanding technology as being value laden or not. Though, as suggested earlier, this might be a relatively trivial difference. In the sense of understanding technology, it does not seem that accepting one view necessitates the rejection of the other. Tiles and Oberdiek (1995) argue a similar perspective, though an added dimension of *control* is propounded in their thesis. Drawing upon biological systems as examples, they argue that, comparable to evolution, technology has a habit of assuming its own identity. Thus, rather than conceptualise technology as being grounded in human intentions, its real nature is uncertain and often unpredictable. There are, as Tenner (1996) argues, "unintended consequences" of technological application, which serve to illustrate the inadequacy of considering technologies by their intentions.

One example of unintended consequences in sport is found in Gelberg's (1995) overview of the plastic helmet in American Football. The innovation was designed to reduce the significant risk of head injury that existed in American Football. By virtue of being more robust than previous leather shells, the plastic helmet was set to promote a new standard of safety within American Football, despite some initial teething problems in design. As Gelberg describes, by the late 1950s leather helmets were no longer used by Football players and plastic helmets became dominant. However, Gelberg explains, the result was not simply a less dangerous sport; instead, the game became even "more brutal" (p.302). While head injuries decreased, a significant increase occurred in the amount of other injuries that were sustained by Football players. This anomaly is also attributable to the helmet since, as Gelberg explains, players would tackle harder, resulting in more injuries to other parts of the body. Players would even learn to use the helmet as a weapon against opponents, as its robust structure allowed a significant

impact upon another person's body. As Gelberg states, "If the helmet hit the player, often the force was devastating enough to cause the player to release the ball." (p.306) A similar example can be found in the development of boxing gloves that were intended to protect the hand, but that resulted in a multiplication of other kinds of injury. As Tenner (1996, p.215) explains,

> Gloved play and the managed interest in the knockout blow encouraged boxers to land one hit after another on the side of the opponent's face. Bouts were sometimes as brutally bloody as the old bare-knuckle fights, but more often the greatest damage was not apparent.

One other central kind of unintended effect includes the consequence of further competitive injustices. An indication of this is the manner in which the new style javelins of the mid-1980s provoked a shift in terms of who were the most competent throwers (further detail of this case is given later). Many more examples can be provided and to take them into account requires drawing upon the broad social context underpinning the implementation of any new technology in sport. The condition lends support to the claim that sports are *not* external to some social context. While some kinds of logic within sport might be closed, the implementation of technology produces changes in the way a sport is played, and thus, the way an athlete trains, or how a spectator views the sport.

This factor is sufficient for Tiles and Oberdiek (1995) to conclude that technology must be understood necessarily within a human, applied context, where it is value laden. On their view, this is not to say that technology is out of control, as is the argument made by Kelly (1994). Rather, it is to recognise that the results of their application, for example, the automobile, cannot entirely be anticipated until it is implemented. This causes a significant problem for making ethical judgements in the context of any technology, since its benefits and harms will not be known, seemingly, until it is too late. Thus, the only possible basis for making such judgements is upon the *intended effects* of the technology and, assuming that such decisions are deemed ethically sound, to then implement the technology and address its unintended consequences subsequently. As such, the categorisation suggested here deals with the intended effects of technologies.

3.2 Categories of Effect

From the efficiency metaphor, one could be led to conclude that technology in sport is driven solely by a performance principle – to make the athlete increasingly efficient. This claim seems reasonable, particularly in the context of elite sport where achievement overrides other criteria of play such as recreation, pleasure, or even exercises. However, even elite sport exhibits different kinds of technological effect. It is possible to cite a broad range of examples as an initial basis for deriving some conceptual framework. This will be done for the additional reason of demonstrating previous literature and the extent of its consideration of technology in sport. For the present purposes, this overview of examples can be relatively descriptive. The categories are arranged and titled by the *intention* behind the technology rather than its resultant effect. The categorisation strives to provide a tacit and not exclusive conceptualisation of how technology – and in some cases, the same example of technology – can have very different effects, some of which are ethically pertinent.

Importantly, the categories derive from the existing literature that has discussed technology in sport. As was noted earlier, little attempt has been made to conceptualise various kinds of technology in sport. Consequently, the basis upon which to attempt such a categorisation is solely upon the sporadic examples listed and these initial clarifications from the philosophy of technology literature.

The list makes reference to literature on two levels. Where an author has problematised the technology to such an extent that he or she has derived a category of effect, then the author is referenced within the general category title. However, where the author has limited their consideration to a primarily descriptive analysis of the technological without any real engagement with the philosophical or ethical issues, then the reference is made specific to the example and it has been a judgement to categorise the technology as such. For example, Gelberg (1995) is referenced both within the general heading – as an author that has engaged with the philosophical effects of technology – and within the

specific example of the plastic American Football helmet, which occurs within the same category, *Safety and Harm*.

Subsequent to this overview, a clearer point of departure might be possible to discern what is meant by 'technology'. It is not possible here to give an overview of each technology. Thus, each section will give a brief outline of the effect being described with a sufficient number of accompanying examples. Finally, a selection of key case studies is used to introduce the ethical implications of technologies. It is important to note that these categories ought not be considered oppositional. Any single technology will respond to one or more of these varying categories. As well, it ought not be construed that one of the terms within a section is morally preferable to another. Thus, for example, in the category of De-skilling and Re-skilling, no statement is being made about the efficacy of these two possible effects in comparison to one another. It is not necessarily preferable that a sport is re-skilled or de-skilled.

Making sport possible

An initial category of effect for technology would seem sensible to reflect the inherent role that technology plays in making some sports possible. The category raises the broader question about what counts as an example of technology since it returns the discussion to the very early examples of sport, the technology for which was manufactured from natural products, such as pig's bladders for soccer balls. More abstractly, technology (primitive or sophisticated) is unequivocally a necessary characteristic of many sports, without which, sport would not be possible. It is thus, no surprise to notice that, as the technology evolves, so too does the sport. In Formula One motor-racing, it is possible to see this most strongly since advances in motor engineering vastly effect the outcome and demands upon a driver and race team. In such a performance-driven sport, the technology has often been argued as being *the* determining factor of success, where the driver plays merely a secondary role (Aveni, 1996). One important conclusion that must be drawn from this is to realise that technologies are not antithetical to sports and that it can only be the way in which they develop – rather than their very existence in sport – that raises ethical problems.

Safety and Harm (Gelberg, 1995).

One of the central aims of technological change in sport has been to improve safety and reduce the risk of harm. The examples include the bizarre needs within javelin throwing in the 1980s, when athletes were throwing dangerously close to the spectators. The only reasonable solution was to change the specifications of the javelin so that the athletes could not throw it as far. This resulted in a change in the kinds of athlete that were successful as javelin throwers, from the strongest to the technically proficient. Other examples include,

- Improved floor surfaces within sports halls to reduce shock to athletes when landing or bounding (Bjerklie, 1993).
- Introduction of plastic helmets in American Football to reduce head injury (Gelberg, 1995).
- More sophisticated shoe design for more support to foot during athletic events.
- Increased wicking qualities in clothing to protect climber or mountaineer from the cold and rain (Rickaby, 1999).
- Spring board surface in diving to prevent slip and increase resiliency of board tips to reduce injury (Bjerklie, 1993).
- Sturdier epee and foil in fencing, as well, Kevlar jackets for more protection but with no loss to movement (Tenner, 1996).
- Navigational equipment in sailing (Inizan, 1994; Tenner, 1996; Root, Domonkos, Granek, and Hustler, no date).
- Carbon composite Poles in Pole Vaulting and enhanced safety pits, allowed more daring contest and higher vaults (Bjerklie, 1993).

These examples identify the role of sports federations or governing bodies of sport to strive for their practices to be less dangerous for the competitors by introducing new technological measures. Their ethical justification derives from an interest in athlete safety and, generally, allowing the athlete to perform at an optimal level without placing undue stress on the body. However, these examples are controversial since their implementation can change the kind of test that is constituted by the competition.

De-skilling and Re-skilling (Gardner, 1989; Hummel and Foster, 1986; McIntosh, 1963; Simon, 1991)

Technological innovation can alter the way in which a sport is played. It can change the conditions of training that are required to be successful at a particular skill, and can even make it easier to perform the required skills. Examples of such technologies include,

- U-groove golf clubs that allowed greater accuracy on stroke (Gardner, 1989).
- Depth finders in fishing to make it easier to locate large schools of fish to enhance prospects of catching (Hummel and Foster, 1986).
- Superman cycling position that allowed more streamlined position for greater speed (Fotheringham, 1996).
- Breathable clothing material used to regulate body temperature in extreme climates (Miah, 2000a).

The Professional Golfers' Association's (PGA) reasons for disallowing the 'square' or 'U-grooved' irons from golf in 1990 reflect how technology can alter the kinds of skill required of an athlete (Gardner, 1989). Gardner describes how tour players considered that the clubs gave the golfer an advantage by creating a higher spin rate, which translated into better ball control. Some tour professionals had been opposed to their use because of a concern that they "devalue true golf skill and consolidate their talent" (p.69). Similarly, Hummel and Foster (1986) recognised that the 'spinning reel' in fishing "virtually eliminated backlash in casting and thus the necessity of an 'educated thumb' to act as a drag on line being cast" (p.46). Thus, the innovation was considered to have democratised the skills of the sport and had *devalued or de-skilled* the activity. While these devices would seem quite useful for a novice who may require assistance to engage in the activity in a meaningful way, their application to competitive sports is implied – yet, it is unclear that such things are beneficial within elite competition.

Additionally, it is not representative to argue that these technologies necessarily de-skill a sport. It may also be argued that technological changes in sports '*re-skill*' an activity. In explanation of 're-skilling' one may consider the controversial 'superman' cycling position introduced by Graeme Obree in 1995. The position entailed the arms of the

cyclist being placed in front of the face and the seating post being unusually high, thus making the position more aerodynamic. Thus, whilst the skill had not been made any easier, it had altered the bicycle such that it did not resemble conventional cycling positions (it had been re-skilled and it made it possible to achieve more without any greater physical capability). Interestingly, the International Cycling Union (ICU), made this very argument when legislating against the use of the position. In concluding their stance on the 'superman' position, the ICU argued that the technical developments had "obscured the physical demands made by cycling, and had made it harder for the man on the street to identify with elite cyclists" (Verbruggen cited in Fotheringham, 1996, p.23). Despite such claims, it might be wondered how the ICU justify the acceptance of methods of design and construction of bicycles that are more comparable to the design of an aircraft than an 'everyday' bicycle. It would seem possible to argue that, on similar grounds, the use of such materials also makes the bicycle unacceptably different from a preconceived notion of what is a bicycle.

Dehumanising and Superhumanising (Hoberman, 1992)

The example of cycling raises a more complicated notion about what can be said about whether an athlete can claim responsibility for any performance achievement and puts into question whether the human athlete or the technology has achieved the performance. However, to answer such a question requires being able to make clear distinctions between each. Indeed, this category presumes that something clear can be said about humanness that is lessened or removed by the use of some technology. This categorisation might be criticised for bringing together two quite different claims about a technology that are not at all oppositional. Indeed, the elite athlete might both be dehumanised and superhumanised by a technology.

Nevertheless, the purpose of this categorisation is to demonstrate ideas about the moral implications of technology so as to identify the kinds of argument that are being made about the effects of technology. In this sense, dehumanisation is justified in as much as researchers of technology have made such claims. Some examples that have been (and

might be) seen as reflective of dehumanising/ superhumanising technologies are as follows.

- Doping and Drug-taking (Hoberman, 1992; Fraleigh, 1984a).
- Genetic Enhancement (Miah, 2000b, 2001a; Munthe, 2000).
- Springboard in diving allowed divers to gain more height on dive (Bjerklie, 1993).
- Fibreglass archery bows, more resilience and more consistency (Bjerklie, 1993).
- Plastic/metal composite discus allows longer throw
- Barbells are now stronger with some flexibility to allow the lifter to use more technique when lifting and drop bar at end of lift to save strength (Bjerklie, 1993).
- Kevlar and carbon-fibre kayaks are lighter, more sturdy and easier to manoeuvre.

Whilst various authors have talked around the subject of how these technologies alter what it means to be a human being, adding content to such claims is more problematic as identifying the salient characteristics of humanness that are removed or lessened by such technology is not easy. Nevertheless, if one is to place any credit at all in these, at least, intuitions about technology, then it is worth considering the possibility that they are not becoming of humanness. If one is not convinced that these technologies do, in fact, lessen the value of humanness, then it can be useful to discuss whether any kind of technology could be a threat to humanness. Would, for example, a human that is largely a mechanoid be a challenge to humanness? If not, then is a robotic human, one whose mental capacities are formed by some artificially intelligent computer, a threat to humanity? If such beings can be seen as a challenge to humanness, then there might be some grounds for concern. Where this line is drawn is less important than the possibility that it could be crossed. The relevance of this possibility to ethics will be identified later. For now, it is sufficient to recognise the possibility of technologies that dehumanise or superhumanise the human performer.

Increase participation and/or spectatorship (Miah, 2000c).

One of the major interests of a sport governing body is to maximise the breadth of inclusion within the given sport. This ambition often translates into the development of technology that can allow a sport to become more accessible to prospective participants. The example is slightly different from developing technologies to make the sport easier, as the main aim here is the maintenance of standards, *with* the broadening of

participation. Alternatively, equipment is often developed that can even exclude particular kinds of individual from participation. For example, the sophistication of technology demands a level of finance that is beyond many individuals. Examples of such technology include the following,

- Artificial turf for field sports (Tenner, 1996).
- U-Grooved Golf Clubs (Gardner, 1989).
- Carbon composite tennis racquets and mass production of other kinds of equipment (Brody, 2000).
- The Carving ski (alpine) that makes it easier to learn skiing.
- Different sized tennis balls (Miah, 2000c).
- Varying speeds of squash ball for different levels of competence.

The benefits of such technology are not complex. The ability to reach a wider audience can seem a worthwhile ambition. However, the ends of such ambitions can be problematic for the sport. For example, in sports such as climbing or skiing, there exist limited natural resources, the overuse of which could seriously damage the environment and lessen the aesthetic experience of the performance. If mountains were overrun with climbers and skiers, they could lose their tranquil characteristics, which would seem to entirely contradict what is valuable about these activities. Along these lines, it is not at all clear how big would be big enough for sports. While the ambition for widening participation is admirable, its justification tends to be founded more upon a financial basis rather than a moral one. Yet, the exploitation of a sport simply to widen participation and generate more financial resources seems ambiguously beneficial.

These varied examples provide some basis for understanding the complexity and effect of technologies in sport. As was indicated earlier, there are further concerns about the unknown consequences of new technologies. This perspective is also considered accurate within the broader social-technological context. For instance, it could not have been possible to truly understand how the combustion engine would affect society or how aeronautic engineering could provoke the realisation of a global society. Equally, within sport it has not been clear how the changes in design would alter the future course of sports and change them as practices.

One limitation of this conceptualisation is the degree of overlap that can be argued for different technological innovation. For example, the improvement of floor surfaces within sports halls that can significantly reduce injury and which would thus, fit within the safety category, also re-skills the activities. As such, it could be argued that the categorisation vastly simplifies any single example of technology within sport and, therefore, does not suitably characterise it.

Consequently, it is tempting to draw some further categorisation about them in an effort to find some conceptual framework that demarcates technologies from non-technologies. Thus, one might separate them into such categories as body, external, internal, environment, or something similar. One might use an example of technology such as genetics as a body augmenting technology or a tennis racket as an external technology. However, this categorisation would not yield any further critical edge to the main question. It is not reasonable to expect that categorising technologies will yield an answer to which ones are acceptable or not.

To demonstrate why this is so, a simplified example will suffice. Suppose that there are two sub-categories within the category of 'dehumanising vs. superhumanising' and that these were 'internal' and 'external' technologies. Thus, one might imagine that examples of internal superhumanising technologies are drug, or the process of altering an athlete's genetic constitution. Alternatively, external technologies that also superhumanise the athlete might be, for example the recently promoted Fast-Skin swimming costume that is designed from special materials that reduce drag in the water. If one is to ascribe any importance to such distinctive characteristic, then, presumably, the intention is to identify whether they are ethically sound. Thus, one might conclude that drug use – being internal to the body – is unacceptable. However, because the swimming costume is added onto the athlete's body and does not involve any physical alteration or harm effects (it is external), that it is acceptable.

As an intuitive method of determining acceptability the categorisation is appealing as it has very clear demarcations. Indeed, this is the level at which many technical commissions of sports governing bodies operate and one might extend such an analysis

by contextualising the distinctions that are given. In the example suggested above, one might inform its distinctions and the conclusions that follow it, by justifying it in theoretically informed terminology. For example, Blake (1996, p.151) identifies the problem with technology that alters the body is that,

> the human body, a collection of bones and orifices and connecting tissues, has somehow disappeared into that dangerous territory 'common sense'. It has been naturalised, taken for granted, as an authentic, and to many people sacred, entity whose composition is fixed and cannot, or rather, should not, be altered. The body has arguably become the last site of humanism.

Thus, one can problematise technology through notions of embodiment. However, this construction of the natural-body is contingent and does not speak to the philosophical implications of sport technologies. It might explain why some kinds of technology are considered to be unacceptable (such as drug use or genetic alteration), but it would not explain which kinds *should* be unacceptable. Thus, it is the very basis for concluding why internal technology is unacceptable and external is acceptable that must first be questioned in order to reach any conclusion. If one's intention is for a categorisation to inform ethical decision making in sport, then one must first have an idea about what makes, in this example, internal alterations unacceptable and external ones acceptable.

The function of having some basic demarcations between different kinds of technological effect, however, does allow the discussion to focus upon the relevant ethical content of technologies. For example, one might inquire into the ethical implications of enhancing safety, re-skilling a sport, or increasing participation. As has been established, the critical question of the thesis is to determine what should be the ethical limits of sport technologies and this might be in the context of technologies designed to affect any of these categories. However, what remains to be clarified is how it can be known that these different effects give rise to ethical concerns. Indeed, the moral content of these technologies must be placed into context. Demonstrating the inadequacy of a broad approach to this problem, the following sections will examine some key cases of technologies that raise ethical concerns for sport and identify the basis of the moral concerns. They will encompass the following:

- Mountain Climbing
- Tennis
- Cycling

The examples chosen are neither exhaustive nor encompassing of the many that could be analysed. However, collectively, they raise issues relevant to the questions of this thesis and thus, will suffice to demonstrate the ethical content of sport technology.

3.3 Case Studies

Mountain Climbing

Recent times have provoked an unprecedented greater plurality in the design and manufacture of technology for mountaineering, encompassing crampons, ice-axes, weatherproof clothing, and bolting technology. Of course, it would be misleading to argue that climbing and mountaineering have ever been *without* the latest technology. Clearly, mountain experiences are constituted partly by having the necessary equipment that can make the experience possible by allowing it to be minimally safe. However, the degree to which mountaineering is now immersed in technology has brought about a recognisable change in the pursuit that has raised significant ethical issues, notable by the reactions and conflict within the climbing community. Two distinct perspectives describe one of the more significant problems within climbing; the separation of 'sport' climbing from 'traditional' climbing. The former argue that technology can enhance climbing experiences, through it making particular manoeuvres safer, or allowing the completion of, otherwise, inaccessible routes. In contrast, more traditional mountaineers argue that the same technology makes otherwise challenging, routes easier and unacceptably de-skills the activity.

One of the specific technologies that is in dispute is retro-bolting that allows a climber to fix an anchor point in a rock-face, where there is no location to place a jamming device. When climbing, it is useful to have such places to reduce the danger if a fall should take place. Thus, when ascending a route, the climber will place anchor points at regular and

convenient intervals. Traditionally, this has been done with a mechanical jamming device called a 'friend', which is placed into a crack and which expands to stay locked into place without damaging the rock. The use of bolting techniques have emerged for particularly difficult climbs where there have not been places to locate a jamming device and so it has made some climbs possible that previously were not. However, in so doing there has also been a defacement of such rocks due to the invasive technology of bolting that actually involves inserting a thick bolt into the rock using a power tool, comparable to a drill. In addition to this defacement, an overuse of the technology has emerged. Climbers have become reliant upon the technology and, in some cases, considered its use justifiable to enable a different kind of climbing experience that allows the climber to focus on the physical challenge rather than the risk involved in climbing. From the traditionalist perspective, this is negative for the mountain environment as it encourages its defacement and, on one view, reduces it to the level of mere physical competition. Additionally, in many cases bolts are not removed from the rock-face, which further frustrates the traditional climber because of the destruction of climbing's aesthetic content.

This dispute entails a disagreement about what kind of activity climbing is and, moreover, what it should be. From each of the perspectives, the community is interested in asserting its own way of climbing as the way in which it should take place to the point of claiming that the other community is not climbing at all. Nevertheless, it can still be argued that there are some other kinds of activity that have no place in mountainous countryside.

As has been suggested earlier, this idealist approach can become problematic due to being highly contested. However, while devising absolute characteristics that can define climbing or mountaineering might appear problematic, there are various activities that would not count as climbing. For example, it would not be accurate to say that one has climbed a mountain if one was carried, or if one were dropped on the summit by a helicopter. Similarly, neither does it seem accurate to say that one has scaled a face if one has done so on an artificial wall, even if that wall entirely replicated the difficulty of the real rock face.[7] Though such examples are simple, it becomes problematic when one

posits the circumstances that reflect current practice. For example, these discussions bring into question whether one can claim to have completed a climb if one has used oxygen at some stage of the ascent. Similarly, it might be argued that, through using drugs to suppress sickness or fatigue, it must also be questioned to what extent the climber or the drugs have been responsible for ascending the route. Indeed, one might even argue that the wearing of highly protective clothing has the effect of making the climb unacceptably easy, through its insulating of one's body from the environment. Clearly, the distinction between what does or does not count as climbing is difficult to discern; though understanding whether the technology is appropriate or not seems to hinge on this very matter (Miah, 2000a).

Because it is contested, it would seem that some ideological concept of climbing and mountaineering is not sufficient to conclude the acceptability of new technology. However, it is important not to completely dismiss the value of deriving characteristics that can be said to give value to a practice. It is also argued that the kinds of technology that appear inappropriate for climbers to use are those that tend to change climbing into the kind of activity that was previously identified as *definitely* not being climbing. For example, one cannot have climbed a route if one has been carried to the summit for the simple reason that one would not have had to physically and mentally negotiate the climb and haul oneself to the summit. Similarly, it is inappropriate to use technology that lessens the degree to which one must exert oneself, physically and mentally. Thus, the use of oxygen or increasingly light and protective clothing are, *conceptually*, not appropriate in climbing, since they are technologies which are underpinned by the desire to make the climb less demanding through providing *a greater degree of comfort or ease* in the climb.

This is not to suggest that climbers should not use such technology (which is the more difficult claim to support), or even that their using them will prevent them from claiming, legitimately, that they have succeeded in their climb. Rather, it is to recognise what one cannot claim to have achieved if using technology that tends a climber towards the de-skilledness. It is this kind of concept that raises an awareness of the potential for ethical questioning in the context of new technology.[8]

If one takes as a case example the development of weatherproof clothing, it can be identified that such innovations have the effect of making the climber more comfortable in the mountains and thus, can be said to have made the challenge easier to accomplish. Such examples as increasingly weatherproof jackets, bags, tents, gloves, and socks, made from the latest Coolmax fabric or Gore-Tex shell are designed for the sole purpose of ensuring a greater degree of insulation of the climber from the elements. Indeed, this is evident from the ways in which manufacturers market their products, advertising how the newest rucksack weighs less than one kilogramme, or how the new tubular rope-break offers "greater security for the climber with reduced energy expenditure" (Rickaby, 1999, p.65).

From such examples, there appears to be some tacit admission that, when climbing, climbers seek their insulation or protection from the elements to some degree. Indeed, the argument can be extended to encompass much more than clothing. If one takes as the salient characteristic of such technological innovations, that they make the activity 'easier', then it can be applied to any new design which seeks more efficiency and effectiveness. Thus, new designs in ice-axe technology, which might seek to enable greater forces being exerted upon the ice though with less disruption and vibration to its surface, actually ensure more control over an environment that, in some sense, might be partly defined and valuable *because* of its unpredictability.

A case might even be made for something as seemingly inconsequential as batteries. The development of more durable batteries could be argued as having some altering effect on climbing performance through it, perhaps, not requiring the athlete to carry supplementary equipment.[9] Such an effect, would translate into lightening the load a climber must carry, and thus, making the climber more efficient and the climb more manageable. Indeed, it is such minor innovations that are significant in transforming the climbing experience, which ought not be omitted from the ethical analysis.

This is not to say that the technology necessarily makes a climb easy. The use of current examples of technology still require the climber to use their body and mind to a great

technical degree to ensure safety and success. However, it matters less that a route remains challenging and technically demanding as a result of technology, than it does that the technology has been used to make the climb easier. The problem is more with the rationalisation underpinning the development and implementation of climbing technology, than with the resulting effect upon the performance. The reason for this is that, if one expands such rationalisation further into the future, one might realistically foresee climbing as becoming significantly automated, which can be argued as impoverishing the value of the activity. Whilst current technology is limited to merely providing oxygen or suppressing sickness (supposedly to enable one to function normally), one must recognise that underpinning such technology is a tendency to automate climbing and mountaineering – to experiences that become increasingly easy because of the available technology.

This uninspiring description of climbing as tending towards greater comfort might seem to be unfair. Clearly, there are quite reasonable arguments to be made for striving towards greater comfort and safety in climbing, particularly when 'more comfortable' means not losing one's life. However, it is this acceptance that requires drawing attention to since, whilst one rationality would conclude the acceptance of ever-increasing safety in climbing, another perspective could be that there is a point at which the enhancement of safety is no longer compatible with climbing experiences. On this view, climbing is partly defined by the taking of risk and to dilute such risk infinitely would be to transform climbing into something that is quite different. To use an extreme example: if one embarked upon a climb with absolute certainty of not coming to harm, then it might be questioned whether this would constitute 'legitimate' climbing. The term 'legitimate' is used quite tentatively here, though deliberately to make explicit the concern that an argument might be made for concluding some forms of technological enhancement in climbing negate the activity as being necessarily (and importantly) risk-full. Thus, it might be argued that climbing is an endeavour that requires accepting the potential for danger or risk, and where one's achievements are attained when in conditions of high unpredictability and danger. [10]

Such claims have been made in the context of the Global Positioning System (G.P.S.) devices, which are intended assist navigation in extreme circumstances (where traditional compass-bearings cannot suffice – as might be the case in a 'white-out' where all around is invisible due to snow conditions). Thus, the G.P.S. provides a greater perception of safety for the climber, which they would otherwise not have were it not for the technology. The G.P.S. functions via a satellite that allows the mountaineer to determine their location, much in the same way as a compass. It is argued that such technology is unacceptable because it does not rely on experience and skilled mountaineering abilities. So, the use of G.P.S. or a cellular phone as a means to getting oneself out of circumstances that would otherwise be reliant upon one's knowledge, experience, skill, and dexterity in the mountains, is quite inappropriate. However, this conclusion holds if, and only if, one is seeking the kind of experience that can be described as entirely independent, autonomous, and in complete isolation with the mountain.

This does not imply that the use of a G.P.S. is absolutely inappropriate in the mountains or even to argue that climbers should not take one into the mountains 'just in case'. The position is well made by the British Mountaineering Council (B.M.C.), in their web-based training document, where it is argued that the use of such equipment "is not a substitute for skill and knowledge in the fundamentals of mountaineering" (BMC, 1999, html). The B.M.C. identifies the logic and reality of the mountain experience as one of grave danger, one that ought not result in death, the risk of which climbers should be proactive to ensure is prevented.

There are few distinctions between climbers that are more obvious than those that distinguish between the traditional and the sport climber. The former with their pitons, axes and task-centred perspective on climbing, and the latter with their retro-bolting and performance-oriented perspective. Each defines their climbing in quite different ways, though each endeavours to engage with a mountaineering experience. Admittedly, it can be argued that climbing has always encompassed a multitude of styles, as is evident from the game playing analysis of climbing by Tejada-Flores (1978). Though the focus

here is upon the changes in climbing brought about by technology, which elicit forms of climbing that might be said to alter or even remove the climber from the performance.

The various technologies in mountaineering provoke a wide range of effects that each respond to the categories in different ways. Many examples, such as clothing or GPS, have a clear benefit of enhancing the *safety* of mountaineering and would thus, seem to be a positive aspect of the technology. However, such a conclusion depends upon whether one places any negative concerns in the *de-skilling* or *de-humanising* effects that the same technology can have. Sport climbers might claim that bolting technology *re-skils* climbing, allowing a wide range of new kinds of experience within climbing. However, it might also be said that the technology is *harmful* to the environment and has reduced the challenge of climbing to a skill-based activity rather than one that involves risk. It might also be considered *super-humanising* insofar as it allows the climber to complete routes that were previously not possible. A further claim is that it *increases participation*, because climbing technology makes it easier to become minimally competent. However, this too might be seen as negative if the mountains become over saturated with people. Finally, it could also be said that there are alarming *unintended consequences* such as the over use and dependency upon technology, where traditional, well-nurtured skills might have sufficed.

Tennis Technology

In contrast to mountaineering, the highly professional, organised, and competitive world of elite tennis raises different kinds of ethical issue in regard to technology. Over the last 30 years, tennis has become increasingly technological; a plethora of changes in racquet technology and increased investment into athlete training and support has yielded players that can be argued as having outgrown the structure of the game. Arguments suggesting that men's tennis has become dominated by the power serve, have promoted the ITF's reaction to consider strategies of resolving the problem.

The last 30 years have also been innovative for tennis in a much broader sense since it was only in 1978 that specifications were made in respect of the tennis racket. For the

centuries of tennis before then, players could use any implement they wished to play tennis; the rules did not prevent the use of anything. This significant change came about after an innovative engineer designed what became known as the *spaghetti-strung* tennis racket. As Gelberg (cited in Radio National Transcripts, 1999) describes it, "the racket consisted of three planes of non-intersecting strings, with a plastic coating on the outside of the strings" (p.77). Using the proposed formulation, the effect of this racket could be said as super-humanising the player, though there were also other effects. The design was particularly interesting for novice players, which was from where the technology emerged. The effect of the spaghetti-strung system was to hold "the ball on the strings longer, allowing athletes to impart greater topspin on the ball than they would with a normal topspin stroke." (Gelberg, cited in Radio National Transcripts, 1999). Thus, it could also be said that the racket served to increase participation in the sport.

However, the racket also created upset on the professional tennis circuit. Players ranking 200th were beating 4th seeded players and so seemed, unequivocally, to entirely change the kind of skills required to play tennis. As such, the International Tennis Federation (ITF) decided to ban the innovation arguing that the spaghetti strings proved to compromise athletic challenge too drastically .

Nevertheless, at the same time the development of composite rackets was also taking place, though the reaction by the ITF was quite different. At the First International Congress on Tennis Science and Technology in 2000, Dr. Howard Brody, outlined that the tennis racket is now "lighter, stiffer, more forgiving, more stable, more durable, and capable of imparting higher speeds to the ball with less effort by the player" (Brody, 2000, p.47). The effect was comparable to the spaghetti-strung racket in one sense – it allowed players to perform more efficiently. However, it was not regarded by the ITF to challenge the integrity of tennis so much that it would need banning. Indeed, Brody notes that it "has also resulted in rackets that makes it easier for a beginner to learn the game of tennis and for the recreational player to enjoy the game more" (*ibid*, p.47). The significance of the two different positions can be said to have greatly affected how tennis has evolved in the last 20 years. Indeed, Gelberg (1986, p.78) argues that, "in making

these two different conclusions it shaped the nature of the sport, the type of athlete who was successful, the type of injuries that plague that game, and the cost of the sport".

Currently, the ITF has a similar predicament which, arguably, has come about partially due to racket technology: the pace of the game. Critics of tennis have been claiming for some years that the elite game is becoming reduced to a serving game. The increased pace of first serves is such that it has become increasingly difficult for a player to return the ball. Consequently, the players with the fastest serve win games and tournaments. If this is the case (and it is, by no means, a perspective shared by all), the criticism is that tennis is a game comprising of many more skills than simply the serve and for so much to rely upon the serve is to reduce the value of other skills.

Presently, men's service speeds are reaching in excess of 140 mph, which is argued by Brody (2000) as approaching the limit of human reaction time for the receiving player. Thus, if serves start to tend beyond this limit, then the elite men's game will become merely a serving competition since no player will be able to return a ball from a serve. As such, it is argued by the ITF that something must be changed within tennis to try to reduce the dominance of the serve and prevent a future for tennis that could comprise of only serving. There are, however, a number of competing views about how this particular problem should be addressed. For example, Gray (1999) outlines various proposals that have been presented to the ITF in the past decade, though have not been deemed acceptable for the following reasons,

Proposal	Rationale	Why it was rejected
Take 10% of the air out of the ball.	Using a slower, flatter ball would result in fewer aces.	This would actually increase the number of service aces as a flatter ball would have so little bounce, it would be almost impossible for the receiver to return.
Go back to wooden racquets.	Today's high-tech, high-powered frames are causing a proliferation of aces and short, boring points.	This would only muffle serve speed by 4%. The biggest decrease in velocity would be on the return, thus adding to the receiver's woes and the server's advantage.
Make the server stand three feet behind the baseline.	The greater distance would slow down the ball and give the receiver a much better look at it.	This would destroy the serve-and-volley game by forcing the server to cover more ground in getting to the net.
Make the service box narrower.	It would reduce the number of out-wide aces.	Every tennis court in the world would have to be relined.
Allow only one serve per point.	To keep servers from gunning the first one, since there would be no second ball to fall back on.	This would also create 30% more double faults, which are even duller to watch than aces.

(Gray, 1999)

In response to these proposals, the decision to experiment by altering the size of the tennis ball has been chosen to curtail the serve. Nevertheless, Brody (2000) recognises that this is not the only possible solution and that it is worth experimenting with other suggestions, such as changing the service court size or raising the net.

In July 1999, the ITF announced its approval of experimenting with different ball types in the professional circuit with an intention to try and address the 'pace' problem. Head of the ITF Technical Commission, Andrew Coe (2000, p.3), recognises that the debate

centres upon mediating a tension between "technology and tradition" and that it is necessary to strike a balance, given that tennis is always evolving. As is outlined in the ITF announcement in *This Week* (1999, July 12),

1. New Ball Type 1 is a faster ball for use on slow surfaces such as clay. These balls will be harder and lower bouncing than standard tennis balls.
2. Ball Type 2 will be used on medium paced surfaces such as hard courts and will be made to existing specifications.
3. New Ball Type 3 is a slow pace ball for use on fast surfaces such as grass and some indoor carpets. **Type 3 Balls will be about 8% larger in diameter than standard balls.**

(ITF, 1999)

From the introduction of new ball Type 3, it is intended that there will be a slight, though significant, reduction in the speed of a serve, thus allowing the receiving player more time to react to the service. From this example, it is important to realise that, from the perspective of a governing body like the ITF, there are a number of competing interests and thus, values. It would seem that one of the major concerns about the pace of the game stems from the interest it can hold for spectators. It has been claimed that if the game becomes a serve-dominated sport, then the number of spectators (and by implication, the recreational player and the participation base of the sport) will begin to dwindle. A comparison may be drawn here with table-tennis, which has faced the problem of how to make the sport watchable, since the pace at which the ball moves has made it impossible for a viewer to observe. As well, the example is interesting because not long after the ITF announced its decision to use new balls, the International Table Tennis Federation (ITTF) also announced 'new balls' to slow down their game (International Table Tennis Federation, 1999).

Returning to tennis, by stating its decision to introduce different kinds of tennis ball to the game, the ITF claims to be acting so as to "preserve the nature of the game" (Coe, cited in Cislunar Aerospace, 1999, html). However, the question is left begging as to what nature and whose game is being asserted, when it is concluded that something is awry.

From the ITF's claims, a number of different reactions seem evident in response to how performance-modifying technology is understood. In the context of the spaghetti-strung racket, the technology seemed to unacceptably *re-skill* the activity, making it something that was no longer recognisable as tennis. On this matter, however, it might also be claimed to have *de-skilled* the activity, since it also made it easier to become competent in the game. Yet, this might also be seen as a benefit for it *increasing participation* in the sport. Other racket designs had the benefit of reducing the severity of injuries sustained by players and thus, can be said to have enhanced the *safety* of tennis. However, this benefit has also allowed players to demonstrate *super-human* capabilities, particularly in serving, which has resulted in the game, for some, lacking creativity and chance. Such an approach to justifying technologies is comparable to the claims about mountaineering technology, where a conceptualisation of the sport is asserted by the practice community to conclude acceptability. A similar perspective is also visible in cycling.

Cycling

In 1995, world-class cyclist Grame Obree got a new bicycle, which would later become popularly known as the 'superman' bicycle, named thus for the position the cyclist adopted whilst on the bike. This entailed the arms being placed stretched out in front of the head, in a similar way to how the fictitious comic-book character Superman would fly. As well, the seating post was unusually high, thus making the position more aerodynamic. Indeed, the rationale behind the technology (the 'intended effect') was to make the rider more aerodynamic, thus reducing the air resistance, which would translate into a faster speed being achieved by the cyclist.

The bike caused a great deal of controversy because it appeared particularly innovative and not all cyclists had the advantage that was conferred by the riding position. Indeed, the International Cycling Union (ICU), made this very argument when legislating *against* the use of the position. In concluding their stance on the 'superman' bicycle, the ICU argued that the technical developments had "obscured the physical demands made

by cycling, and had made it harder for the man (*sic*) on the street to identify with elite cyclists" (Verbruggen cited in Fotheringham, 1996: 23). However, such reasoning creates problematic boundaries of distinction by claiming only certain changes within a sport alter the 'form' of that sport. From such a position, one would find it necessary to consider at what point an alteration to 'form' becomes unacceptably distinct from the original design.

One may argue that changes in the construction materials of a bicycle (lighter and stronger) affect the physical demands of the sport in a similar way. However, innovations of this kind have been accepted within competition. By claiming that the 'superman' position no longer resembled a 'bicycle,' the ICU suggests a quite precise prescription of the bicycle. However, drawing upon Wittgenstein's (1953) ideas about 'family resemblance', it may be argued that the limitations of this prescription are within some form of acceptable 'resemblance' whereby one recognises a number of characteristics that can identify a term. Thus, altering a number of the characteristics, such as the construction materials of the bicycle, may still enable the identification of the bicycle. However, as the Obree example may illustrate, there are degrees to which resemblance can be maintained, and the 'superman' position, the ICU argues, went beyond this acceptable resemblance.

The example might seem a little surprising since the technology used to design world-class bicycles utilises space-age material and engineering techniques that are deemed legitimate. Moreover, the superman innovation was less about technological advancement than it was about a change in design, which might equally have taken place decades before. Indeed, the example raises a further question about the limits of questioning performance modification. It is not necessarily artefacts that are being discussed, but that scientific processes and design are also of interest.

This is not the first example of high-technology in cycling. Indeed, cycling is an interesting sport to consider for it having been fundamentally constituted by technology and for it utilising technology to make the sport more dynamic. As Tenner (1996, pp.234-5) describes,

> In the 1960s and 1970s, narrow-tyred derailleur-equipped bicycles, though more difficult to maintain and use than the three-speed variety, helped promote a bicycle boom in the United States....the purpose of the derailleur was to achieve the greatest possible variation in mechanical advantage according to terrain, along with the lowest possible weight.

More recently, the development of the 'tear-drop' helmet would also create a great deal of controversy, it too transforming the cyclist into a being more alien than human in form. Again, the intended purpose behind this innovation is performance enhancement, through the reduction of wind resistance.

In the context of these cycling technologies, a number of claims can be made about their intended effects. More often than not, cycling technology has had the explicit aim of making the cyclist go faster. Whilst this is not done by altering the athlete, it is achieved my manipulating the form of a cyclist to reduce what might be termed as *performance inhibitors* (Perry, 1988). Arguably, this is simply a disguise for making the athlete *superhuman* though the example is complicated as there can be no real sense of what a cyclist is, to know whether reducing wind resistance gives a truer reflection of that cyclist's abilities, or whether it *de-skills* the activity.

3.4 Preliminary Conclusions on a Conceptual Framework for Understanding Technology in Sport

A number of preliminary conclusions can be made on the basis of this case-by-case overview of specific innovations.

Technology is too Broad a Concept (Top-Down does not work)

Initially, it can be claimed that the generic concepts of technology, performance enhancement, safety, and so on, cannot be used to derive general principles that can lead to an ethical theory about sport technology. It is not possible to make general conclusions about the efficacy of, for example, enhancing *safety* in a sport, or *re-skilling* an

activity. The ethical status of these intended effects can be understood only in the context of the specific case (the applied context). This is not to say that conclusions made about any one technology cannot inform other ethical inquiries about similar technologies. However, it is not sufficient to abstract the intended effects from their context.

Technology has varying degrees of moral content in sport

Second, it can be argued that new technologies are not always accepted and fans, athletes, spectators, and governing bodies are not prepared simply to accept that any technology is acceptable. As such, because technologies matter in sport, they raise the need to assert some ethical framework for understanding them. Thus far, it has been shown that there are various responses that are given to new technologies, which reflect a particular way of asserting an ethical perspective. Thus, what might be termed the *governing body* perspective is evident from the case-studies where some appeal to the integrity or essential natures about the sport is asserted. In other cases, technologies are seen as unacceptable because they introduce an inequality that is considered unfair, such as the fibreglass pole for pole-vaulting or the Fast-Skin swimming suit. As such, an initial basis for concluding what is right or wrong with any innovation in sport, must entail an articulation of sporting values. It requires asking the basic ethical question 'what is wrong with this technology?' Furthermore, some discussion must be made about the varying perspectives, which can be conflictive. For example, the interests of the sport, the spectators, or the athletes can lead to the assertion of different moral standards that requires substantial navigation.

In response to these conclusions, it is incumbent to specify what will be the focus of the remaining part of this thesis and how these initial conclusions can inform a more in-depth discussion about the ethical implications of sport technology. It has been concluded that any ethical analysis must be directed at a specific case of technology rather than technology in general. These conclusions, thus, serve as a guide for a more detailed analysis of a given technology. As was indicated at the outset of this thesis, the interest here is to understand the ethical implications of genetic modification (GM) in

sport. The reasons for selecting GM as the central example of ethics in sport technology require clarification. Indeed, the investigation could proceed in a number of directions from here, particularly since previous literature examining sport and any kind of technology (except for doping) is relatively non-existent. However, GM is a particularly interesting case to understand in sport and, unlike other technologies, can speak to a great breadth of issues about legitimate performance modifiers in sport. Arguably, GM is likely to challenge the acceptability of performance enhancement most persuasively in the next decade. As well, it is an innovation quite distinct from other methods of doping and drug use and which, thus, raises new challenges to applying arguments about the legitimacy of performance enhancement and sporting values.

Applying information and knowledge about genetics to the practice of sport is not something particularly new. Indeed, the practice reflects an evolution of techniques used by physiologists and other scientists to better understand how the body works and how to render it more capable of performance. Nevertheless, altering the genetic composition of athletes is an emerging science and something that has attracted substantial criticism already.

The relationship between elite sport and genetic engineering has become increasingly apparent, particularly since such organisations as the World Anti-Doping Agency (WADA) and the International Olympic Committee (IOC) have begun to take the issue seriously. In June 2001, the IOC convened a working-group to examine how best to address the prospect of genetic modifications in sport. Already, key figures in the sporting world have begun to condemn the application of genetics to sports, though the necessary ethical inquiry to ascertain its ethical status has not yet taken place. One alarming concern is that the direction of a policy about GM in sport already seems to treat it as another method of doping. This approach completely misrepresents this new technology and that substantial ethical inquiry must ensue to arrive at a coherent policy in sport. As such, an important rationale for studying the ethical discourse about genetics in sport is its immediate importance. It can be argued that the present time is a critical period in the formulation of arguments about genetics and that such discussion can determine the manner in which genetics is handled by sports. Thus, the present

interest is to try and inform this discussion and provoke a way of theorising value in sport that is more coherent than the straightforward policy of *strict liability*[11] that governs anti-doping codes.

The conceptual framework derived from the examples considered thus far, provides a manner in which this ethical analysis must take place. The aspiration to derive over-riding principles that can inform a broad debate about technology in sport is considered insufficient, which challenges the manner in which sports governing bodies often theorise the notion of performance enhancement. The examples reveal the imperative to break-down technology into individual cases and then, perhaps, even further so to allow for quite specific conclusions to be made about each kind of innovation. Without such conclusions, it could be tempting to try and assert some guiding moral principle to determine whether genetics (or other technologies) are 'good' or 'bad' for sport. However, such an approach vastly oversimplifies the complex relationship between sport and technology.

4. Ethical Implications of Genetic Modification (GM) in Sport

4.1 Outline of Case

Already, genetic engineering has been used for experimental purposes in developing research to treat disease through alteration in non-germ line human cells (somatic); those cells that are not hereditary (Gardner, 1995). The effectiveness of this research is still unclear, though it is not difficult to imagine that, if successful, then it could generate interest in the benefits of germ line (hereditary) therapy and enhancement.

While engaging in philosophical discussions about GM might once have been mere futurological discourse, the last decade – if not more – has shown that societies are not always prepared for new technologies as they become utilised. The moratorium set by former U.S. President Clinton in 1997 on the cloning of human beings seems indicative of this, particularly, in the case of genetic technologies. Some four years later, in the summer of 2001, an Italian scientist announced that there will be the birth of the first cloned human baby in 2002. Only months after this, the same scientist announced that a woman was 8 weeks pregnant with the first cloned human baby.

Nevertheless, the science of gene therapy is in relatively early stages of development and much is unknown about complex gene disorders and our ability to do anything to manipulate genes with any degree of safety. However, a great deal of literature has emerged from biomedical ethics (bioethics) to address this new technology and its imminent reality is being taken seriously on a global scale. Within this literature it is possible to identify phases that reveal how the ethical discussions surrounding genetics have moved from principle-based approaches, to arguments that recognises bioethics as being a discipline requiring a more casuistic approach to ethics.

Neither of these ways of doing ethics has been without criticism, though the comments are more generic to the theoretical approach than unique to the applied cases for which

it is used. Thus, principalism – the process of applying moral principles to derive ethical conduct in specific contexts – is criticised for being too absolute and vague, departing from contested ideals without any real connection with specific cases. Conversely, casuistry – literally the study of cases to arrive at ethical conclusions – is critiqued for departing from a view from nowhere and is seen as superficial and somewhat arbitrary therefore, as was recognised in the methodology. Nevertheless, in the case of bioethics, it is reasonable to argue that the specificity of the issues under discussion demands a more casuistic approach to ethics, and this is also reflective of current trends in bioethics. As Carter (1998, html) explains,

> In place of moral theory and the application of universal principles of moral action or agency, methods of bioethical inquiry from these perspectives include narrative and interpretation, case study and casuistry, and procedural decision-making by consensus, as occurs in many bioethics committees and commissions.

As well, bioethics has now a noticeable presence within philosophical literature, which is addressing the many implications of gene technology. Within the last ten years, the rise of bioethics has been noticeable through the emergence of national bioethical committees, such as the UK Nuffield Council on Bioethics, the US National Bioethics Advisory Committee, and UNESCO's International Bioethics Committee. Indeed, it is relevant to be aware of these debates for the current thesis as the ethical discussions can provide useful parallels in the subsequent conclusions.

During this time, bioethical research has considered such broad issues as the patenting of human DNA and problems with ownership of life (Miah, 2002). Most recently, this has been highlighted by the publication of the Human Genome Project, the biggest scientific collaboration in the history of medicine. This project has completed the mapping of the entire human genome and, thus, provides a vast source of information about the nature of human genes (Harris, 1998; Reiss and Straughan, 1996; Wilmut, 1999). From this research, concerns have arisen about the power of genetic knowledge to instil the essentialist fallacy that genes alone can determine a person's health (Elliott, 1999; Keyley, 1996; Macer, 1990; Nagl, 1998). Indeed, similar arguments could be

made in respect of sport, when arguing the limits to genetic influence upon performance.

When applied to the sporting context, there is, however, more of a need to understand how GM might be relevant. While it will be shown that research is developing to apply knowledge about genetics to sport, it is not clear whether these applications will be realised. Presently, many of those that would lead to enhanced athletes are experimental, though other kinds of application might be equally alarming. Nevertheless, because the technology is still somewhat hypothetical, it is necessary to make some tentative assumptions that will underpin the ethical discourse.

Assumptions about the genetically modified athlete

It is possible to genetically engineer a human to be better at sport

Perhaps the most immediate question that must be argued about genetics is whether it is actually possible to engineer a person with a particular modification in mind – in this case, a predisposition for athletic excellence. Is it possible to engineer a great mathematician, artist, athlete, or philosopher? Whereas the bioethical dilemmas challenge the acceptability of gene enhancement (getting from therapy to enhancement), this particular assumption is about the *possibilities* of the technology. Without the possibility, the issue becomes more speculative philosophical theorising than applied ethical research that is grounded in substantive social problems.

While there has been no engineering of specific genes in order to enhance a person's physical capability beyond what is humanly possible, some research has suggested that specific genes are responsible for specific kinds of predisposition such as criminality or alcoholism (Philpott, 1995). Such claims are of interest more to the tabloid press than the serious scientific community, where associations between social behaviour and genetics are tenuous at best, though, more often, entirely rejected (Ho, 1998). Nevertheless, within a sporting context, a substantial amount of research has begun to take place to explore these links.

The application of genetic knowledge to sports tends to have been limited to elite performers, where the benefits of performance knowledge are clearest. Hoberman (1992) makes reference to this imminent technology by identifying its logical inevitability in performance-based sport. Some years later, studies are beginning to explore the ways in which genetic information could be used to augment the human athlete. Of particular mention is the use of gene therapy in sports medicine, specifically to reduce the time spent injured by genetically repairing the injured athlete (Lamsam, Fu, Robbins, and Evans, 1997). Dr. H. Lee Sweeney has conducted comparable research at the University of Pennsylvania. Dr. Sweeney has researched the possibilities for using the protein called insulin-like growth factor-1 (IGF-1) to repair muscle tissue.

Dr. Geoffrey Goldspink at the Royal Free and University College Medical School in London makes similar findings. Using a form of IGF-1 called mechano growth factor (MGF) with mice, which is used to treat muscle-wasting diseases such as muscular dystrophy, Goldspink's team were able to isolate muscle tissue and insert the MGF gene. The results showed an increase in muscle mass by approximately 20 percent after two weeks.

At Harvard University, Dr. Nadia Rosenthal used IGF-1 in gene therapy in mice to halt depletion of muscle strength that comes with old age. As Rosenthal notes, "Older mice increased their muscle strength by as much as 27 percent in the experiment, which suggested possibilities for athletes as well as for preserving muscle strength in elderly people and increasing muscle power in those who suffer from muscular dystrophy" (cited in Longman, 2001, html).

As well, genetic science has endeavoured to target specific genes that can be identified as determining biological characteristics, such as the capability for endurance (Cogan, 1998). Recently, research has taken place to identify the effects of inserting genes into a virus to produce a specific bodily effect. Such research has taken place at a number of institutions, particularly using erythropoietin (EPO) to increase endurance. For example, at the University of Chicago, Jeffrey Leiden used an adenovirus to deliver epo

to mice and monkeys, to observe whether it would render a difference in biological capabilities. By inserting the gene into a virus strand, it was subsequently transported throughout the body and did, indeed, have the effect of increasing the level of red blood cells that were being pumped around the body. In performance, this produces a similar effect to that of blood-doping, which operates on a similar principle by re-introducing blood into the body to boost the amount of oxygen being transported around the body, to off set fatigue. Thus, genetically inserting epo into an athlete could increase the capabilities for endurance when active, which would be useful for any long distance event.

While no such research has been applied to humans, the possibilities for improving endurance capabilities for the purpose of competing are clear. Indeed, similar work has been conducted by Dr. Steven Rudich, of University of Michigan, where inserting epo into the leg muscles of monkeys produced a significantly elevated red blood cell level for 20 to 30 weeks (Longman, 2001). A slightly different kind of gene therapy has been directed towards increasing muscle mass. Again, this has taken place at a number of institutions and involves the protein IGF-1.

In spite of this research, simply because specific genes might influence specific capabilities does not make it possible to engineer athletic capability with any degree of certainty or safety. By altering one gene, one might actually influence the function of other genes to the detriment of the individual's health (Harris, 1998). Certainly within the immediate future, there seems little reason to suppose one might engineer a specific gene without any imbalance occurring between other genes – a phenomenon known as *pleiotropy*. As such, it might be deemed too risky to do any kind of engineering for any kind of gene. Beyond engineering the 4,000 genes involved in single-gene disorders such as Huntington's disease or muscular dystrophy, the possibilities of medical genetics are in question (Appleyard, 1999).

Although one can argue that the evidence is inconclusive in showing whether genetic manipulation could safely engineer genes with a view to a specific kind of enhancement, there is growing evidence to suggest that this might be possible. Furthermore, when one

recognises the infancy of genetic research and what has already been achieved in this relatively short amount of time, it would seem naive to ignore such possibilities.

There would be an interest to genetically modify humans for sport

The second assumption that is made within this analysis is that people would actually want to use genetic engineering to make their children more capable for sport (or for any activity). In this assumption, there appear to be two issues that must be considered. First of all, it must be argued whether persons would seek to engineer their children at all. Second, it must be considered why, out of all the possible kinds of alterations that might be available, one would choose to engineer an embryo to become a super-athlete. After all, it is likely that enhanced capability for sport would be but one of a supermarket of genetic possibilities that could be chosen. Thus, it might be possible to engineer an embryo to be better predisposed to become a great doctor, carer, musician, or scientist.

To deal with the former difficulty initially, it could be argued that there is something unnecessary about enhancing the genetic composition of a human embryo. As any loving parent could testify, life is so very precious that if one's child was born free from any causes of pain or discomfort, then to seek improvement upon this would seem ungrateful to such good fortune. Indeed, it might be considered immoral to genetically engineer such a child if there were a potential for jeopardising the baby's future health that might ensue by doing so. However, again it is possible to consider the hypothetical prospect that the health risks would not be of significant concern. Moreover, if necessary, it could be argued that the health risks are non-existent and that engineering one's child would definitely be without any cause of harm to the child. It is conceivable that, still, a parent would not wish to effect such fundamental changes to the body of their child and so, the engineering would still not be particularly valuable. In some cases, it can be supposed that a parent would not wish for their child to go through any kind of surgical operation so early in life.

However, a further complication might be added if two possible scenarios are imagined. First, the circumstances could be such that the genetic alteration would not be at all invasive. Thus, it might simply be a case of the child taking a spoon full of medicine. This minimisation of the technology's invasiveness removes the possible claims that invasive medical technologies are morally problematic. Alternatively, it is possible to imagine that the baby (or even the foetus) has a known genetic malfunction of some kind that can be corrected by GM. As well, the further condition can be added that the parents – in seeking for their child to be healthy – might also make their child better than well. The child must go through some invasive surgery, though to make the child well or better than well would pose no difference in risk. Thus, the parents are faced with the choice of making their child much more capable without it posing any greater risk to the child's health. There would seem no immediate reasons for why the parents would not wish to modify their child for the better (presuming that the child's health is the only concern).

As for whether people would choose to enhance the athletic capability of their child over other characteristics, athletic capability has in its favour that such engineering could be described so as to yield direct health benefits, whereas to enhance the brain functioning of an individual might not. Of course, one might respond to this by arguing that genetic engineering to create an elite athlete would actually be to create an unhealthy body, since an elite athlete's body is abnormally fit and not healthy from a long-term perspective. However, this objection need not be relevant since the circumstances need not assert such specific enhancements as specialised training would bring. Rather, these discussions are concerned with engineering general health properties that would provide subtle, though significant, changes to athletic capability.

This is an important point as some ethical discussions about genetics have been criticised for being completely far-fetched to the point of not being genuine applied ethical issues. As renowned bioethicist Peter Singer argues, the claims to cloning elite athletes and other great historical figures are completely ridiculous as it completely misunderstands what are the implications of the technology (Singer, 1999). In contrast, the kinds of GM that are of concern here are those that could enhance human

capacities for athletic capability. For example, it is not being claimed that it is possible to engineer an elite swimmer or football player. Rather (and at most), it is argued that GM could provide some basis for making humans more predisposed to having the potential for being an exceptional athlete by providing the genetic basis for elite performances in a broad sense.

It seems reasonable to assume that such opportunities would be of interest to some parties even if such motives were morally questionable. When faced with the choice of whether or not to try and ensure a healthier future for one's child (providing the risk is negligible), the logical, individualistic, choice would surely be to do so. There would seem something quite logical about trying to ensure a more fruitful future for one's child by safe genetic engineering. Indeed, conferring genetic enhancement might simply be construed as being akin to "giving one's child a good education" (Ayabe and Tan, 1995, p.463).

GM would render an 'edge' in competition

There would seem to be no other reason to genetically enhance one's child (and subsequently to consider the ethical implications of doing so), than for the very knowledge that the risk of engineering a life that could be 'normal' would be far less than the potential benefits. Unless there can be some degree of certainty that the engineering will have the effect of placing one's child at an advantage, then there seems little reason to pursue it.[12] As such, there is a need to address whether genetic heritage actually makes a difference to the success of an athlete or the health of an individual. Is it really possible to argue the significance of this one characteristic, when so many other factors influence an athlete's performance? Arguably, the many years of training, dietary specialisation, failure and striving to better oneself that an athlete must endure, cannot be undermined by simply genetically enhancing oneself, as appears from placing importance in the ethical consideration of this technology. Yet, accepting that genetic heritage does play *some* part in determining success does not commit one to 'genetic essentialism' - the view that all that consists of being human is an individual's genetic predisposition. The evidence that genetics does make a significant difference to

performance in sport is limited (Cogan, 1998). However, given that the difference between elite competitors is now so marginal (Kearney, 1996), the ability to enhance even a small component that affects performance is an advantage that is likely to be exploited (even if human life is not). As such, it is an important ethical consideration because of the danger of placing so much emphasis upon it in determining which athletes will be successful.

Genetically modified athletes will not be the only kind of athletes

The final assumption made by this analysis concerns the way in which engineered humans would emerge within society. Recognising that societies will not, suddenly, find that persons who are not genetically engineered no longer exist, the fairly unproblematic assumption is made that there will be circumstances whereby the genetically engineered will live alongside the non-engineered. This likelihood raises questions about equity, ontological issues of normalcy, and the potential for prejudice between persons of different genetic capabilities that are quite extraordinary. One might wish to draw parallels with the kinds of differences between people of different cultural origins and argue that the engineered class would be of a similar difference. However, unlike the distinguishing characteristics of any race or culture, the defining boundaries will be, overtly, biological - which seems to challenge a great deal of work to combat racial boundaries deriving from alleged biological difference (Appleyard, 1999).

The practical ethical implications of this might be to argue that such technologies are unacceptable, since they would serve to promote segregation and boundaries between people, the removal of which has been the ambition of much social work, education, and integration. This is not to suggest that the engineered class will be any better than the non-engineered. However, it would most certainly be the case that a non-engineered class would be noticeably disadvantaged, when compared with people whom are genetically engineered.[13] For sport, this matter has practical implications precisely because sport aspires to such ideals as fair play and equal competition. The degree to which sport really does embody these values would thus be tested by the existence of

genetically engineered athletes (and the way in which ethics is theorised by sports authorities in respect of the technology).

Together, these assumptions provide some basis for considering that the implications of GM for sport are significant and that they raise an array of ethical dilemmas for the organisation of sport. As well, these assumptions provide an underpinning rationale for the ethical analysis of genetics in sport, which is critical to the methodological approach to ethics in this study (Ozawa, 1996).

Applications of Genetic Research to Sport

The current, scientific research interested in utilising genetics in sport is not exhaustive of the possible applications of GM to sport. As has been claimed in the earlier categorisation of technologies, any ethical analysis must be directed towards specific cases, each of which have varying ethical implications. Perhaps the most succinct and comprehensive articulation of the varied kinds of application of genetic knowledge is from Munthe (2000). In Munthe's analysis of the various forms of gene technology that might be used to engineer sports champions, he considers four main categories.

First, Munthe discusses the possibility of how information about genetic predispositions and their influence on the body might be used to fine-tune already established methods of training by manufacturing more effective drugs (genomics). Such information is comparable to how other scientific discoveries within sports medicine have yielded greater ways of making training more efficient. The relevance of findings from the Human Genome Project would be of particular relevance here, though it is important to recognise that this application does not entail any GM of the athlete at all. Rather, it is simply a process of utilising knowledge about genetics to create more effective ways of enhancing performance using drugs or by optimising training methods.

Second, Munthe outlines the possibility of engineering the somatic cells of the body – the non-hereditary cells. The non-hereditary cells of the body are those that constitute the elements of the individual that are not passed down to the next generation. Quite

rightly, Munthe identifies such techniques as being most comparable to the ways in which athletes currently use other methods of doping. The procedure is performed upon already fully developed human beings. A useful example of this is the possibility that somatic cell engineering could be used to develop genetically modified red blood cells to enhance endurance in a way that is comparable to the effects of erythropoietin (EPO) and blood doping.

One stage further from this possibility is the engineering of germ-line cells, Munthe's third category. Such engineering would most likely take place very early in life (within some days of conception), due to the complexity of engineering such genes. As such, the effects are hereditary and have the added ethical implication of affecting subsequent generations.

Munthe's final category of genetic technology is its use for the pre-selection of athletes. This seemingly eugenic possibility, where prospective athletes could be chosen on the basis of their genetic predisposition for athletic capabilities is, Munthe suggests, not very different from coaches going to watch young athletes and selecting which are most deserving of investment.

A similar categorisation is given by Tamburrini (2002), though it is also made explicit that the pre-selection of athletes could be made at the embryonic stages of human development and not only by testing infants and young children. As Tamburrini (2002, p.254) argues, this would ensure that "resources can be concentrated on those 'good prognoses' who are in possession of the right physiological conditions to become top athletes". The use of genetic pre-selection, derives from the medical utility of screening for genetic dysfunction. The basic principle is to introduce a *probe* into the DNA molecule of the subject. This probe attaches itself to the subject's DNA with a view to revealing disorders in the genetic make-up (Macer, 1990).

As well, Tamburrini (2002, p.255) offers some further detail on the process of germ-line GM, that recognises there are two methods of conducting such engineering. The first entails a similar process to engineering somatic cells, though the cells are then

"introduced into a blastocyst, thereby changing the germ-line of the future individual." Alternatively, Tamburrini describes, "the other procedure involves cloning. An adult somatic cell is genetically modified and, then, the DNA of this cell is introduced into an embryo by way of cloning, from which the new individual originates."

Consequently, the possible applications of genetic science to sport maybe summarised thus:

1. Genomics (using genetic information to improve methods of performance enhancement by creating more effective drugs and training techniques).
2. Somatic-cell modification (altering the non-hereditary cells of the body, such as those specific to muscle tissue).
3. Germ-line modification (altering the hereditary cells of the body very early on in life).
4. Genetic Pre-selection (using information of a person's genotype to conclude suitability for sport either at embryonic stage or infantile stage).

Thus, the applications of genetic techniques are various, as are the ethical issues raised by each. As has been identified already, the kinds of genetic modification that would be applicable to sport would be therapeutic or enhancing and the legitimacy of the technique would seem to hinge upon this distinction. The example of pre-selection does not really correspond to this notion, though the rationale behind deriving such knowledge for sport would, similarly, be for ensuring the most capable genotype for a given activity. Consequently, the ethical analysis of genetic technologies in sport must deal with the various cases separately.

Nevertheless, some generic claims can be made that underpin each of the various applications described above, which can provide a useful starting point for understanding their efficacy. These claims can be placed into the conceptual framework provided in section 3.1 to understand what specific kinds of effect are implied by GM.

4.2 The Ethical Issues

Making sense of these various applications and their ethical implications in the context of GM is now possible using the conceptual framework provided earlier in the thesis. To reiterate, the earlier conclusions argued that the moral content of these applications must be understood in terms of their intended effects. Consequently, it is necessary to understand how the effects in the framework are affected as a result of genetic technologies.

MAKING SPORT POSSIBLE: How does GM make sport possible?

In reference to 'making sport possible', two perspectives can be asserted that describe the ethical limitations upon using technology based upon the conceptual framework. The first can be called the *radical view* and stipulates that,

> *Technology ought not to be employed where it is not necessary; where necessary means that, without the technology, the sport could not be played.*

This perspective recognises that technology is often a necessary and constitutive aspect of any sport, though, importantly, does not endorse the continual development of innovations. For example, this view would accept that technology is necessary for the sport of tennis to be played. Without a tennis racket, tennis ball, or net, there would be no game. However, this view does not consider it necessary (and thus, ethical) to continually re-design such equipment. Although it might seem that the principle is essentialist in character, it does not base ethical decisions about technology in the context of some ideal form. Rather, it simply asserts that, for example, tennis played with hi-tech rackets is a *different kind of game*, than tennis with wooden rackets. In this sense, parallels can be seen with this and the earlier discussion about traditional climbing and sport climbing. It is not that the view need claim one ideal of the sport as being superior to another, but that they are two different kinds of activity and, if our interest is the former version of the sport, then the technology ought not be employed. On this view then, it also takes a position on the ethical acceptability of re-skilling a

sport using technology. However, since GM does not have any consequences on re-skilling, it is not necessary to delve any further into this matter.

A more *moderate view*, which is perhaps more representative of how governing bodies address change in sport argues that

> *Technological development is acceptable where it is required to allow the continued enjoyment of the kinds of performance to which it aspires.*

This view is comparable to assertions about using technology to preserve an alleged 'integrity' of the game (Gelberg, 1996; Houlihan, 1999; Simon, 1991). Again, this can be seen clearly in the tennis example given earlier, where it is claimed by the ITF that the need to alter the tennis balls was premised upon wanting the game to continue being of a prescribed character. In this case, the criticism was that the dominance of the serve in men's tennis (which might be seen as a revenge effect of other technological developments) had rendered an imbalance in the game's playability.[14] Thus, the technological change in the ball type (at least experimentally) had been justified on the basis of wishing to maintain the *playability* of the game.

In this case, it seems evident that an ideal version of the sport is being asserted. The credibility of this kind of argument need not be addressed immediately, since – as has been noted – the focus here is to understand how GM fits within this view. Although one might critique such an essentialist approach, it may prove to have little relevance for the present case if the claim is not warranted. Consequently, the radical view would conclude that GM is not at all ethically sustainable. As well, from the moderate perspective, GM is unethical unless its use contributes to gaining a nearer approximation of the ideal sport. Thus, in order to legitimate any kind of GM on this view requires demonstrating that its use promotes relevant values in sport.

Intuitively, it would seem that GM does not make sport possible. Sports have not needed athletes to be genetically modified to be playable. Indeed, all that gives sport value currently has been due without any credit to GM. Thus, GM is not like an item of sports equipment, without which it would not be possible to play the sport. As such, it

would not seem relevant to consider GM as a technology that has the effect of making sport possible and, as such, it is tempting to dismiss it as unethical. However, a more considered inquiry into this question reveals that it is a matter that is premised upon a theory of sport – what it really means to be playing sport. To reduce sport simply to teams or individuals competing with the necessary equipment in the relevant court and according to some rules, is not necessarily sufficient to conclude that sport is taking place (Feezell, 1988). Rather, answering the question demands a greater explanation about what it means to be playing sport.

From this perspective, then, GM might actually make sport possible if one accepts that a basic value of sport is that it is interested in the surpassing of known limits or, more generally, the fascination with producing extraordinary performances. Thus, one basis for concluding that GM is ethically justified is that it is a necessary technology in order for sports to continue breaking human limits. The unstated assumption is that sporting value derives from the breaking of human limits and it is here where the argument must be made more substantial. However, there is a significant empirical element to the claim that also requires clarification: Are sport performances reaching the limits of unmodified human capability? As well, affirming the answer to whether GM makes sports possible requires analysing whether, accepting that there are human limits, GM would be the preferred method by which further enhancement should take placee.

The Empirical Claim

Research lacks a consensus about whether human beings are approaching or, indeed, have already attained natural limits in elite sport. As Loland (1998a, html) argues,

> As biological beings, our capacities for improving speed, explosivity and strength are limited. It is, for example, inconceivable to think of a hundred-meter sprint in, say, 5.00 seconds. Our phylogenetic potential does not change over night, and a hundred-meter sprint is still one hundred meters long.

In contrast, Kirsch (1986, p.18) argues that the following factors can provide much more scope for enhancing athletic performance:

1. Constant increase of the medium height
2. Increase in the number of people who practice sport and increase of the children of great athletes who show excellent disposition to sports
3. Selection based on talent
4. Methodical encouragement of the more talented athletes
5. Improvement of training methods and, consequently, better schooling of the coaches
6. Improvement of sports techniques, mainly as a result of biomechanical research
7. Technological development (improvement of the materials and revision of the rules)
8. Protection and assistance of the athletes from the community as a whole
9. The public opinion's growing interest that encourages competitive sports, especially women's sports
10. The effective policies of the Federations.

However, answering this empirical question is not really the interest of this thesis. Rather, the consequences of either conclusion are important to consider. If, indeed, humans are not approaching their performance limits, then there is no basis for arguing that GM is ethically justified on account of it making sport possible or, at least, that other means might be more desirable to employ before using GM. However, given the ambiguity in research about this matter, it is worthwhile considering that it might be the case that human limits are approaching and so, to respond to the ethical discussion surrounding this possibility.

The Evaluative Claim or, The Value of Limit Breaking in Sport: Does it necessitate the use of GM?

The evaluative claim in relation to human limits is not at all contingent upon empirical research. It speaks to the associated values of sport and is evaluative because it asks a question about what kinds of values ought to be associated with sport. The perspective concedes an affirmative response to the initial question that humans are, indeed, approaching their natural limits and subsequently, inquires into the value of sport that is driven by an interest in sustaining performance enhancement. Thus, the argument preceding this inquiry into the value of limit breaking is as follows:

P1: Maintaining sporting value is necessarily tied to limit breaking

P2: Non-natural performance modifications are necessary to break limits

C: Sporting value requires non-natural performance modifications.

Despite the unfortunate (and contested) use of the term 'natural,' which will be problematised later, the following argument begins with accepting premise 2. It is now required to argue whether Premise 1 is persuasive. As will be clear from the conclusion, accepting both premises does not necessarily have anything to do with GM. However, in this case, the interest is solely with genetic technologies that do actually enhance the human being. Consequently, it is not all kinds of GM that are of interest here.

Genetic pre-selection is of little interest to this debate, as it does not alter the human being in anyway. At most, it could be used as way of refining the pool of elite athletes to ensure that those competing are the very best possible (biologically). As well, the interest is not in GM that can render therapeutic effects on the athlete. As such, the debate is guided towards technologies that are not taken seriously in the scientific literature (i.e. genetic enhancement). The possibility of actually enhancing a human being's capacity for sport performance is rejected by the medical community, as inherently unethical and scientifically dubious. For reasons identified earlier in relation to the effect of pleiotropy, the possibility of being able to genetically engineer specific performance characteristics is uncertain and important to consider for this reason.

Furthermore, a limiting condition should be placed on this ethical argument so that the weight of conclusions from these two questions is put into context. The reliance upon human limits and the importance of world records as a basis for legitimising performance enhancing technologies, is most relevant only to some sports. In athletic events such as sprinting, jumping, and throwing, the world record is clearly discernible and is given value. However, in sports such as football or hockey, it is less clear that human limits are important. Thus, this would seem to lessen the strength of any possible conclusion in regard to 'making sport possible'. As Loland (2000, p.44) states, many ball games are

> built on a different logic. Performances are not quantifiable in exact physical-mathematical entities, and there is little or no talk of records here. Performances are relative and depend upon interplay between competitors. Every game is different and cannot easily be compared in quantitative terms.

However, in contrast to Loland, it can be argued that all sports are governed by human capabilities, no matter how complex the game. As such, accepting that these capabilities are fixed, then the implications of human limits does have importance even for, say, football. Every kind of game can be broken down into skills, of which the significance of human limits plays a role. The most complex ball games are premised upon a relatively fixed idea of the human body. For example, the height of a basketball net is relative to the height of a basketball player. The size of a soccer or hockey goal is relative to the size and reactive possibilities of the goal-keeper in conjunction with the ability of a striker to be sufficiently accurate enough to make the challenge of goal-keeping difficult, but not impossible. In tennis, the limits of human reaction time are suggesting very serious consequences for the game as the speed of the serve continues to improve. Thus, the relevance of human limits *does* impact upon game playing sports as well as individual performance sports, though in different ways and perhaps to greater and lesser extents. While it might be the case that the attainment of human limits would not prevent the playing of these games or imply that they will not be interesting interactions to watch, it does suggest the possible disappearance of extraordinary performances.

On this view, it is claimed that significant value is placed in games where innovative and extraordinary performances are exhibited and that the possibility of witnessing such events is part of the appeal of game sports. The interest to see new tricks and techniques using a ball are limited by the physical limitations of the body. If it is not possible to see new kinds of creative game-play, then one is left somewhat disappointed with the repetitive game event. However, the degree to which this is of value and the extent to which it will take priority over other aspects of sport is in need of questioning.

The importance of record breaking and, more generally, of providing more spectacular human performances is reflective of various perspectives about what value in sport has

become in the latter part of the 20th century. It is not unreasonable to claim that elite sport is exciting and valued in some way because it is reflective of the pinnacle of human performance (Tamburrini, 1998). As Loland (1998a, html) recognises,

> The fascination for records is a key element in our fascination for sports. Records are the stuff of which legends and myths are made. Johnny Weissmuller's 1924 one hundred meter freestyle swim under the minute, Wilma Rudolph's fabulous sprint records from the early 1960s, and Michael Johnson's explosive two hundred meter record run at the 1996 Atlanta Games, are all paradigmatic examples of Coubertin's ideals. The record stands as a symbolic message of human greatness and infinite possibility.

By extension, Tännsjö (1998) refers to our fascination for excellence as an admiration for strength rather than weakness – the winner is admired. Indeed, Tamburrini makes explicit this claim, arguing that "*in general terms*, the results achieved by an athlete are a central element in the attribution of excellence" (p.42). Also in favour of associating performance attainments with excellence in sport, Hoberman (1992) argues that the pursuit of modern sport is necessarily about experimenting with human limits. This value derived from deep-seated ideas about what constitutes human identity and possibilities, and is caught up in the Enlightenment project of progress. For this reason, what makes physical achievements important to sport must be questioned. As Loland (2000, p.42) notes, "The logic of quantifiable progress has in a common-sense manner become a normative ideal in sports."

However, it is the content of excellence that is of importance here. Tamburrini (1998, p.44) critiques Tännsjö on account of his narrow definition of excellence as *strength* and, in response, argues that "provided we adopt a plural notion of excellence, I see no inconsistency in admiring the most excellent athletes without feeling contempt for the less skilled". Yet, Tamburrini's thesis is equally premised upon excellence as performance and such prejudice is revealed when he claims that "Handicapped athletes, for instance, only achieve relative top performances" (p.45). Aside from critiquing the comparison of disabled sport with able-bodied sport, it can be argued that this performative basis for deriving a theory about sporting excellence is relatively shallow.

Indeed, it can be argued that the value of breaking human limits does not override other values and thus, necessitate the employment of performance enhancing technologies. Even if some value in sport is attributed to the importance of results, it is not necessarily the case that results are, or should be, a primary value. Indeed, the importance of results in sport has not always been so clear. Even within some non-western sports, where the importance of winning is significant, the emphasis on it is secondary to the ritual and spectacle of the event. Indeed, Allen Guttmann writes in his 1978 text *From Ritual to Record* about the peculiarity of modern, Western sport to place so much importance in recording sporting achievements. Guttmann is puzzled by the modern obsession with results and measurement, which, he argues, is born out of the 17th century scientific revolution. Thus, an initial retort to excellence as performance is to recognise that there are other ways of valuing sport.

This peculiarity raises the question about to how valuable performance enhancement is assessed within sport (elite or otherwise). Despite the conventional connotation of performance enhancement as being about making an athlete perform better in a quantifiable, measured sense, it need not be the case. Performance enhancement might also refer to performing better in a sense of, for example, an athlete's character. Instead of rewarding the winning team and placing them as being the most admirable team, it could also be possible to reward the team that has played most fairly, as is done in many contests. Indeed, the latter would seem to respond much more to an ethical inquiry into sport as it speaks more to moral actions than does simply winning a contest. Thus, basing value in sport primarily upon performance enhancement is not a tenable idea, if one hopes to derive an ethical theory of sport.

In support of this idea, a number of arguments have arisen in the philosophy of sport asserting a MacIntyrean approach to deriving sporting values. Alisdair MacIntyre's (1985) distinction between the internal and external goods of sports provides a basis for a more substantial theory about what things give sport value.[15] The former, internal goods, relate to those aspects of performance that can be achieved only by participating in that activity, whilst the latter are more generic. For example, an internal good of tennis, might be the feeling of hitting a backhand topspin that travels along the court in

a perfect line away from the opponent. In contrast, an external good might include the financial reward that the same backhand topspin might provide by winning a competition. In this case, financial reward is not something that is unique to the practice of tennis, and thus, is to be construed as an external good.

A comparable argument can be made in the context of record-breaking, which can be seen as an external good because it is not something that is achievable only within the specific activity. As Schneider and Butcher (1994, p.65) argue, "victory, while valuable on a variety of counts is only of sporting value if achieved as a result of more skilful play in a fair competition." Reid (1998, html) adds that, "we view winning as much more than scoring the most points or crossing the line first. We view winning as the manifestation of certain virtues inherent in the athlete in a given performance."

Similarly, and contrary to the notion of sporting excellence as performance attainments, Gibson (1993, p.48) claims that "Excellence applies to any quality or feature in which the person or thing excels or surpasses all others." Thus, record breaking and straightforward physical accomplishments are seen here as being far too narrow to sufficiently represent excellence in sport. Indeed, Gibson argues that, "If athletics is nothing but a fight for a prize, then it is a spectacle and de-humanizing. As such, athletics would not be an arena in which excellence would have any meaning" (*ibid*, p.59). This recognition of the inadequacy of results and performance standards in sports as quantifiable results, leads necessarily to the rejection of the value of breaking human limits as a justification for legitimating performance enhancements.

This problematising of sporting or athletic excellence is also developed extensively by Kretchmar (1992), where he argues that excellence must be described in relation to internal goods rather than external ones. The former are those which allow the practice to flourish and which are attainable only by practising the activity to which they are attached. Moreover, focusing upon the attainment of external goods is to the detriment of internal goods. Consequently, the basis for ethical decisions in regard to sport technology should be premised upon whether they contribute to the attainment of internal goods or not. The underlying premise is that the standard of excellence is tied

to the means of attainment more than in performance accomplishment. The view is affirmed by Schneider and Butcher (1994), who consider that, if a person performs an action solely for the sake of the extrinsic rewards, then there is no good reason to perform the act properly, or well, or even not to cheat. Importantly, this recognises that an ethical theory about sporting excellence necessarily consists in a dialogue about virtues and the attainment of internal goods rather than external goods. By contrast, external goods, do not allow for an ethical discourse because they are necessarily self-centred, selfish, and individualistic ends.

In sum, it is not convincing that the 'human limits in sport' argument warrants the acceptance of performance enhancing technologies, such as GM. Recalling again the argument structure detailing whether non-natural methods of performance modification are necessary in sport, Premise 2 of the argument is rejected.

P1: Maintaining sporting value is necessarily tied to limit breaking

P2: Non-natural performance modifications are necessary to break limits

C: Maintaining sporting value requires non-natural performance modification.

Basing an ethical theory of sport upon performance standards is not simply bad ethics, but no ethics at all. Rather, the value of performance enhancement is, here, considered insufficient to base any ethical perspective about sport. Yet, if this argument is sufficient to concede that the value of breaking human limits does make performance enhancement acceptable, then the subsequent question will still be relevant to answer. However, if one accepts that sporting values have little to do with breaking human limits, then there would be no need to posit the subsequent question and GM will *not* be justifiable on account of it making sport possible.

Nevertheless, the arguments support the idea that performance enhancement, if not the only thing, is an important factor in modern sporting values. As such, it is important to consider the alternative conclusion that champions performance modification. The value given to breaking human limits that is identified by such authors as Hoberman (1992) and Gibson (1993) gives sufficient social significance to the possibility that such

factors might have importance for sport, despite their seemingly immoral character. However, affirming this initial question does not necessitate the use of GM as a means to enhance performance. At most, it is a case for re-evaluating what constitutes a legitimate method of performance enhancement and inquiring into which kinds of intervention should be used.

Therefore, to conclude that GM makes sport possible is also to assert that the ethical implications of GM are preferable to other means that might also be used to make sport possible, where human limits prevent the enjoyment of sport. This, however, has not yet been clarified. Moreover, to make any such conclusion requires further elaboration on the ethical implications of GM in regard to its other effects and how it compares with other methods of doping that might also be used to break human limits. Such a comparative analysis must be extensive and is not the focus of this thesis. Nevertheless, subsequent categories will speak to the issue, by challenging the concept of performance enhancement.

SAFETY AND HARM: How does GM affect harm and safety in sport?

Potentially, any of the four applications of genetic information would promote safety and reduce harm in sport. The use of genomics can allow the provision of greater, more effective medical treatments for athletes when injured and even provide a greater recovery after injury by improving currently used drugs. Alternatively, the engineering of somatic or germ cells could be with an interest to make the person more resilient to disease or injury. Engineering 'resistance' genes could make the athlete more healthy and subsequently more capable of performing and training well for sport. As well, if genetic information could reveal that a child might have a predisposition to a specific kind of medical condition or injury, then it could be used to deter that child from competing in a given sport and thus prevent the injury from happening.[16]

With somatic and germ-line cell engineering, the potential for reducing harm is equally probable, though also more speculative. If one could imagine a situation where an

athlete seeks to engineer their somatic cells to enhance their performance, then they might use unsafe techniques to achieve this. If this occurred, then this would be a basis for rejecting such technology from ethically acceptable methods of performance enhancement. However, if the methods are shown *not* to cause any harm to the health of the athlete, then the basis of health harms alone does not warrant their rejection. Yet, this is not an argument that is unique to GM and can be made against any other kind of performance modifier, including drugs.

Regardless of these effects, the analysis does not deal sufficiently with the ethical issues arising from safety and harm. While it seems that there is a basis for arguing that GM can be conducive to health, the issue of harm has a further complication. Whereas increasing safety seems to speak specifically about the safety of an individual or individuals (in terms of people), the concept of harm can be seen more broadly. As such, it is necessary to understand what is meant by harm and which kinds of harm arise as a consequence of legalising (and banning) GM in sport. It is understandable that the two elements of this effect appear similar, since to increase safety would also seem the same as reducing harm. However, the concept of harm need not be directed to physical harm (what might be termed as *risk of harm*); whereas safety would seem more of this type. Thus, the concept of harm might be broader than simply harm to an individual.

This idea is summarised by Schneider and Butcher (2000) when discussing *respect for sport*. In general, it requires asking whether the given sport technology incurs any kinds of harm that has moral implications. Such harm may or may not be directed to an individual. Consequently, two levels of inquiry must take place to understand whether a given technology is affecting the level of harm in a sport in an acceptable way. Initially, it must be questioned whether the technology increases or decreases the *safety* or *reduces the risk of physical harm*. Second, it must be asked what *other kinds of harms* derive from the employment of GM in sport.

The former question, however, demands an empirical answer that currently cannot be given. In terms of genomics, it can be argued that knowledge about genetics *could* provide a more effective and healthier way of altering the athlete or providing more

effective medication. Equally, the experimental nature of such technology in the near future could render it difficult to have a comprehensive awareness of the long-term harms deriving from such drugs. Alternatively, genomics might simply allow further ways for the drug-using athlete to avoid detection at anti-doping tests or for the creation of new enhancers that have even greater health risks. Nevertheless, if one accepts the basic premise behind genomics that its purpose is to provide a better understanding of biology, then it would seem to promote better kinds of medication, even if they are made illegal in sport. For this reason alone, it would be necessary to revisit the legitimacy of drugs, which do not have any detrimental physical effects for the athlete in the long or short term.

Structuring the various perspectives about other kinds of harm is a rather more complicated task. Various appeals to the significance of harms, the integrity of sport, normative values such as fair play, and the obligatory imperative of agreements or contracts in sport competition are examples of harms created by using methods of doping. Moreover, various authors integrate or separate these categories depending upon their focus. Schneider and Butcher (2000) is particularly useful here, as it approaches the issue of doping in a rather different manner to the present ethical inquiry, though also gives a comprehensive overview of the harms resulting from doping. Thus, their overview can be seen as bringing together a number of the perspectives that have been asserted throughout the last 20 years in the philosophy of sport literature and is thus, endeavouring a similar task to the current one. However, their approach is markedly different from the present aims and worthy of comparison therefore.[17]

Schneider and Butcher's categorisation of 'reasons for why doping should be banned' comprise: cheating and unfairness, harms (including harm to athletes who dope [users]; harm to other [clean] athletes; harm to society; harm to the sports community; harm caused by bans), perversion of sport's nature, and the unnaturalness of dehumanisation. In contrast, the present approach includes a number of their other categories within the framework of 'harms'. Thus, the effects of doping creating *unfairness* or being a *perversion of a sport's nature* are each considered here to be harms (as opposed to different kinds of effect). The definition of the problem might seem a relatively trivial point, though it is

significant because it derives from a conceptualisation of technologies in sport within which forms of doping are included among other kinds of technologies such as sports equipment. It might be contested that non-health harms warrant a separate category of effect completely, though this is less relevant at this stage and requires further attention and argument about the conceptual framework for understanding sport technologies than is possible here. It would also mistakenly conflate the differences between categories of effect and the moral issues deriving from sport technologies.

The present categorisation will encompass those that are made in Schneider and Butcher's overview, though includes a number of their other reasons for banning doping within the general category of harms. The differences between the two approaches can be seen by the following table:

Schneider and Butcher's (2000) categorisation of harms (in bold)	**Present categorisation of harms**
Cheating and unfairness **Harm** - **harms to athletes (users)** - **harms to (clean) athletes** - **harms to society** - **harms to the sporting community** - **harms caused by bans** Perversion of sport's nature Unnaturalness and dehumanisation	Harms to others - athletes (users) - unfair advantage, safety - athletes (non-user): - unfair advantage, contract violation, coercion - members of the sporting community - expectation disappointment; role models Harms to Society - aversion harms - technological momentum Harms to Sport - unfair advantage - rule breaking - compromise of internal goods - unnaturalness - not an earned advantage

The exception is their category of 'unnaturalness and dehumanisation', which is considered here as being a different kind of effect of GM altogether. The basis for this discussion will be provided in depth in the subsequent section, though can be explained by recognising that an argument in respect of GM based upon naturalness and dehumanisation requires a very different set of reasons to demonstrate than do other kinds of harms. To argue about naturalness and dehumanisation (and subsequently superhumanisation), requires a basis of arguing what constitutes the human being. In contrast, the harms that are included here rely upon an assertion about what is sport or the salient aspects of an athletic performance.

Thus, the category of harms here includes harms to others, society, and sports, within which Schneider and Butcher's other categories of 'arguments against doping' are encompassed. For example, Schneider and Butcher's 'cheating and unfairness' category

appears in the form of a number of different kind of harms in various sections of the present structure. One criticism of this approach might be that it is not sensible to argue that non-living entities can be harmed. Thus, the categories of 'harms to sports' is not meaningful. On such a view, because harm is something that must be felt, such entities cannot be harmed because they are incapable of perceiving such harm. At most, the harm that is done to non-living or abstract entities is felt indirectly by persons who perceive that there has been harm committed. Consequently, it might be accepted that the harm is indirect but, nevertheless, has consequences for human beings. For this reason, harms to non-living entities are separated from specific others.[18]

It can be useful to remember that this interest to clarify harms derives from understanding the ethical implications of technologies that affect the level of harm in sport. It was concluded earlier that health harms (or health risks) are of limited relevance to the discussion about GM as they are largely speculative and empirically contingent (although the hypothetical cases should be addressed). However, it was identified that there are other kinds of harm that are morally relevant in the discussion about the ethical status of GM in sport. Generically, these can be called 'other harms' and comprise harms to other persons, society, and to sport, which are of a moral, rather than a bodily injurious nature.

A further consideration must recognise that there exists no thorough categorisation of potential harms resulting from GM in sport. As such, to respond to the kinds of harms that might ensue from GM is somewhat of an experimental and tentative task. However, there is some basis for a comprehensive structure that can be used, which builds upon the categorising of non-injurious harms that derive from other kinds of performance modifications in sport. Mainly, this speaks specifically to methods of doping, in particular, the use of drugs. It is surprising that, still, there has been only a limited amount of attention directed towards other kinds of doping methods and their legitimacy, such as the use of altitude chambers or tents to improve endurance capacity (Clarey, 2001b). This generalistic approach to understanding the ethical issues of doping is insufficient since, even if some claims can be made about doping in general, it

does not assist with the consideration of the specific cases and their particular ethical status.

The system of categorising non-health harms in sport deriving from GM is premised upon two distinctions: old and new harms. The former will speak to those harms – relevant to GM – that are identified in conjunction with previous literature that addresses the harms deriving from doping (substances and methods) in general. Alternatively, 'new harms' will reveal further harms that can be the effect of employing GM in sport, which will draw upon general, relevant harms about the use of GM. While there is some degree of overlap, the distinction is useful to provide the additional insight into how GM compares with other kinds of performance enhancement in sport. It is important to recognise that the initial approach will be to consider the harms of *legalising* GM, rather than the harms associated with *banning* it, the latter of which is addressed by Schneider and Butcher (2000). These banning harms will be addressed in conjunction with the response to legalising harms and will take place in the conclusions.

The old harms of legalising GM

In the philosophy of sport literature, a variety of harms can be identified in relation to doping, that might be summarised thus,[19]

1. Coercive (Tamburrini, 2000; Gardner, 1989; Lavin, 1987; Parry, 1987; Simon, 1991; Tamburrini, 2000).
2. Unfair (Schneider and Butcher, 2000; Gardner, 1989; Lavin, 1987; Parry, 1987; Simon, 1991; Tamburrini, 2000, 2000).
3. Health Risks (Schneider and Butcher, 2000; Holowchak, 2000; Brown, 1995; Lavin, 1987; Parry, 1987; Simon, 1991; Tamburrini, 2000, 2000).
4. Unnatural (Hoberman, 1992; Houlihan, 1999; Lavin, 1987; ; Perry, 1988; Schneider and Butcher, 2000; (Tamburrini, 2000).
5. Rule Breaking / Cheating / Respect (Arnold, 1997; Houlihan, 1999; Simon, 1985, 1991).
6. Unearned advantage (Carr, 1999).
7. Contrary to / Does not promote the internal goods of sport (Schneider and Butcher, 1994).
8. Contrary to the nature of sport (Tamburrini, 2000, 2000; Simon, 1991).

While these are often cited as reasons for justifying the banning of various forms of doping, there is no consensus that one or some of them is sufficient to warrant the complete rejection of all forms of doping from sport. In relation to these discussions, there has been an emphasis upon analysing drugs as the primary method of doping in sport. This is not surprising since drugs have been particularly alarming in their likely promotion of physical and mental harm for the athlete. However, such an emphasis upon drugs in the sport philosophy literature has given rise to a distorted perspective about what kinds of harms might exist in relationship to performance enhancement, generally. As well, it has prevented a more holistic approach to understanding the way in which performance modification is valued in sport. Nevertheless, drug use provides a starting point to discuss what are the other kinds of harms (besides physical ones) associated with doping methods in sport.

HARMS TO OTHERS

A number of harms to others involved with the competitive sport experience have been addressed previously. These consist of the harm that can arise by breaking a tacitly agreed contract and thus breaking with the ethos of sport. As well, some athletes will be harmed by the result of GM producing further unfair advantage for the modified athlete. Finally, harm can also arise from athletes being coerced into using GM to remain competitive. In addition, it is necessary to distinguish between two kinds of athletes in the context of these harms. A similar approach is taken by Schneider and Butcher (2000) in relation to drug use, where they distinguish the different harms brought upon athletes that are also using drugs and those who are not. In this category, it is possible to distinguish between athletes who are using the performance enhancement (users) and those who are not (non-users).

Other: athletes

Users

Unfair advantage: For the user, contrary to what might be assumed, there is still an equality differential wrought by the enhancement. Thus, even though the athlete using GM might be seeking to gain an advantage over others, they might actually be placed in

a worse position by so doing or by embracing such technology as an accepted method of performance modification. This is evident from the use of drugs, sports equipment, or even nutritional supplements and recognises that the same method of performance enhancement does not necessarily guarantee the same level of enhancement for all its users. It is not the case that all athletes using EPO will incur similar benefits to their performance. The harm then, derives from an expectation that using the enhancer will necessarily place one at an advantage over others, which it might not. This harm is somewhat contingent upon the potential dangers of using the enhancement, but is premised simply upon the use of such performance modifiers as being self-defeating, if the athlete hopes to gain a competitive advantage. In response, this harm might simply be avoided by removing the expectation that the technology will have beneficial consequences. Indeed, if an athlete is minimally aware of how drugs function, then this expectation might not be so prevalent.

In the case of GM, the argument is similar, though the investment from the athlete might be considerably less. If genomic drugs are more effective, then there is even more of a basis for expecting a significant change in performance, though if their benefit remains unclear, then this harm might still be avoided by education about the likely success of genomic enhanced drugs. Through germ-line cell engineering, this concern is not relevant since the modified embryo will know nothing of the alteration to have any expectation about its effect. Potentially, there might be a disappointing expectation if the growing child expects to be a successful athlete due to their genetic predisposition. However, this can be lessened by information outlining that genetics alone is not a guarantee of any exceptional athletic capabilities. For genetically pre-selected athletes, there is no guarantee that all those who have an exceptional genotype will be selected by gene-scouts and so disappointment might also ensue to, for example, parents who might have expected their enhanced child to be chosen. However, disappointment in life is not sufficiently persuasive to warrant the removal of the causes of disappointments. As such, this does not seem a particularly significant harm to use as a basis for rejecting GM.

Safety: Conflicting perspectives can be asserted on the basis of safety and harm and their relationship to technology in sport. As the earlier example of climbing clarifies, for some sports it can be claimed that there exists a degree of risk that, if lessened, would lead to the de-valuing of the performance. Thus, to remove the risk of harm from climbing or any extreme sport, could be argued as unethical on the grounds that it is contrary to the characteristics of the sports that give it value. An alternative view states, to the contrary, that technology is morally justified on account of it making a sport safer, where a greater degree of safety is considered valuable. Examples of such application might be found in the case of the American football helmet or helmets used in boxing, which were intended to increase the safety of the athletes.

In summarising the position, it seems that a technology is justifiable if it contributes to the level of safety in the sport, where such safety is sought and where such safety is not contrary to the purpose of the sport that makes the practice unique. Thus, it would make little sense to introduce a system in climbing whereby it could be possible to retreat from the rock face, without fear of falling, regardless of how far one has ascended. Such an activity would be more characteristic of traversing a rock face (bouldering), which is used more as a basis for training and is not considered to be the same as ascending a rock face. Equally, it would make sense to provide accompanying support to an expedition team, as might be said is achieved by the Global Positioning System device.

In the case of GM, the argument from harm must ask whether GM is more or less harmful than other kinds of performance enhancement and whether the harm that is created by the technology is an integral or acceptable part of the sport. From one perspective, it can be argued that the risk to health taken by athletes is no greater than the risks taken by virtue of participating in some sports at all. For example, boxing and equestrian events are among the most dangerous activities that are used as past times and competitive events – regardless of whether the athletes take drugs. The potential for severe injuries is remarkably high and the harms from using drugs to run fast might be seen as relatively negligible by comparison. Equally, the risks from GM might be substantially less than these other forms of performance enhancement.

There is, however, some basis for arguing that it is of little consequence to compare the harms between different sports. One criterion to employ might be to argue that it is foolhardy to tolerate or encourage the use of technologies that *increase* the harm within a sport, beyond that which must be accepted for one to be able to participate. Thus, one might accept the harms of boxing, but not tolerate increases to harms in boxing resulting from using drugs as well. This might seem a rather self-serving criterion upon which to judge the harms of sport in general, though it departs from a perspective that accepts that sports are worthy of participation *despite* their inherent harms. The perspective does, however, beg for a justification about the ethical importance of tolerating high risks of injury. However, this is a question of evaluating the acceptability of sports, from a social perspective, which is of little interest here. Instead, it is assumed that, despite their danger, some sports are valuable because of their risk for injury. However, the gratuitous increasing of this risk is not necessarily acceptable, unless it can be argued as enhancing the value of playing the sport.

For GM, it seems a particularly difficult case. As has been suggested earlier, the use of genomics is likely to provoke a safer use of drugs. Scientists can have more certainty about the effects of drugs on the human body and so drugs derived from genomics would be more desirable than non-genomic drugs. In the cases of somatic and germ-line manipulation, the degree of safety would also be greater than drug use, precisely because this technology would not be used until such a point that it is safe to use within medicine. Once such a standard is set, it would be hard for sports governing bodies to then ban the technologies on the basis of safety. The use of somatic cell engineering raises concerns about the abuse of technology, which can have as many possible harms as the abuse of drugs. However, unlike drug use, the legitimate use of GM would most likely have health *benefits* and so would be desirable alterations. In respect of genetic pre-selection, this bears no direct relation to the discussion, though it can be argued as having a number of positive consequences for an athlete's health regarding the selection of suitable genotypes for suitable sports that can, for example, prevent injury. As such, the harm of health risk seems less concerning in the case of GM than it might for other

kinds of performance enhancers. Moreover, these harms ought not to be seen as significant enough to warrant the rejection of GM.

Non-user

Unfair advantage: For the non-user, the harms are rather more transparent. Initially, there is the obvious harm of being disadvantaged in competition as a consequence of the opponent using a performance enhancer that is not available to others. The salience of this from an ethical perspective has been made clear in numerous cases in sport where an innovation has been banned on account of it being inaccessible to a significant proportion of the athletic community. For example, the development of the fibre-glass pole in polevaulting (Houlihan, 1999) or the superman cycling position (Fotheringham, 1996) or the FastSkin swimming suits (Magdalinski, 2000), are all cases where the technology was seen as ethically problematic by governing bodies because it was not available to all participants.

Underlying this judgement is the premise that the contest *should* involve athletes of equal standing - no athlete should have access to means that others do not. Importantly, this is not to say that all athletes should use the *same* equipment (which is the case in some sports). Rather, it is to recognise that all athletes should have the opportunity to maximise their performance capabilities by having access to all known methods of performance maximisation. In many cases, it might be that the same piece of equipment does render an advantage for all athletes (such as using flippers in swimming). However, in sports such as skiing or even the case of the FastSkin suit, it is not necessarily beneficial for all athletes to have the same equipment.

Presuming that the technology is effective, there would seem to be an advantage that is gained by using GM. As well, it is likely that such technology would not be available to all competitors in some cases. For example, germ-line engineering -necessarily taking place early in life - would not be an option for athletes later who found themselves competing against germ-line engineered athletes. For this reason, there seems strength in concluding that it is unacceptable to place the two kinds of athlete against each other

on the basis of equal access to enhancements. For the case of somatic-cell or genomic engineering, there does seem less of a reason for concluding that the technology could not be available to all athletes. Save for arguing that the modifications would not be financially viable for some athletes, there is no reason for why athletes of any description might use the technology. Yet, it is not clear that the affordability of the technology is even a sound basis for concluding that it is unfair, since a variety of training techniques and facilities are available only to the wealthy countries, and this is tolerated as an unavoidable inequality in sport.

One exception to this rule might involve the availability of these technologies as medical treatments. Currently, the development of GM is seen as wholly a medical technology and its use for performance enhancement in sport, or enhancement in general, is highly improbable in the short term if the funding for such research derives from the public sector. As such, the most immediate genetically modified humans would be those with corrections to gene-related disorders and not those seeking an extra inch of height to play basketball. Accepting that such therapeutic applications might also confer an advantage for physical competence, then it would seem unfair to place the engineered athlete against the non-engineered athlete because the means of gaining that advantage would not be available to all.

However, it is not unethical in sports that some athletes are genetically more predisposed to performance than others. Indeed, it could be argued that competitive sport requires making such distinctions (Simon, 1984).[20] Given that GM would only alter these, already, unfair imbalances, the claims to GM rendering disadvantaged athletes in competitive sport would seem rather self-serving for the naturally gifted athlete. Thus, the unfairness created by genetically modified athletes is no greater than the level of unfairness that currently exists in sport. Indeed, genetically modifying athletes could be used as a means to creating greater parity among athletes. A similar case can be made for drug use. The only possible way in which either of these modifications is unfair is if the opportunity to use such technology is *not* available to all participants.

One might argue that GM is unfair because this kind of difference has been afforded by a deliberate intent to gain an advantage, which is unacceptable. However, it is rather tenuous to claim that such advantage had been intended to place a person at an advantage within sport, since such a decision would likely not be made with any particular sporting career in mind. Genetic modifications would, most likely, have some general health motivation, rather than an interest to be good at sports. It is also rather excessive to ban a genetically enhanced individual from competition on the basis that they have an unfair advantage over other competitors. Apart from being prejudicial towards such individuals, one must be consistent and, as well, disqualify even those individuals who have a naturally enhanced genotype. Upon such a rationale, *reductio ad absurdum*, all genetic difference should be removed from competition (at least this should be the moral ideal). Alternatively, it might be argued that the sports competition is constituted by achieving as much as is possible with the genotype one has, which has been determined without any intervention. If such a position is credible, then it must be shown what actually counts as intervention. Following any such criteria, one might find it problematic to allow an individual into competition who might have had only therapeutic GM.

The degree to which the unfairness provoked by GM is unethical depends upon how one theorises what is the accepted level of fairness in sport. It is, so to speak, to depart from a theory of justice in sport. On one view, organised sport is already inherently unfair in many respects, since it does not differentiate between genetic differences. At most, sports such as boxing or judo distinguish between body weight. However, there are many more sports that provide no opportunity for athletes of a disproportionate genetic predisposition than there are which do recognise that humans of different body types are equally worthy of elite sporting status. This is most clearly reflected in the constitutive elements of sport such as basketball or volleyball, where the net is at such a height that one must be at least 180cm if one aspires to elite level competition. In such sports, there are no divisions for shorter players. Thus, accepting that genetic difference already exists in sports, it is necessary to articulate what makes GM unfair. It would be unfair if the intention behind it was to gain an advantage over other players, though it need not be the case. If GM takes place to equalise the genetic pre-dispositions of

competing athletes, then there would seem a case for making it legal. As Breivik (2000, p.154) argues,

> Sports organisations have an obligation to make it possible for all, not only to take part in a certain sport but also to compete at a high international level....classes based on body build should be introduced.

Contract violation: A further claim from the non-user is that performance enhancements that are neither within the rules, nor excluded by them, violate a tacit agreement between athletes that they will all play by the same rules. The act of deception (which using any other means would imply) fails to acknowledge the other as an individual with their own interests and, thus, treats them as a means to an end, rather than an end in themselves. This contract-like approach to conceptualising sports competitions asserts that the non-user is cheated and deceived by the user. As Schneider and Butcher (2000) articulate the position, "When athletes enter a contest, they agree, and form a tacit contract, to test their skills in the ways permitted by the game concerned. On this account, unfairness or cheating is wrong, because it breaks the agreement" (p.7). A similar perspective is asserted by Arnold (1992, p.247), claiming that,

> when a person voluntarily chooses to enter a sport he or she makes a tacit commitment to abide by the rules that are applicable. To renege upon the agreement is rather like making a promise and then not keeping it.

Contract arguments in relation to performance modification have also been alluded to in relation to an unfair advantage. From this position, it is claimed that the use of illegal performance enhancements breaks a tacit agreement between players about the acceptable means each will use to compete together. However, the position requires restating outside of the perceived unfair reasons that would make violating such a contract unacceptable.

The argument is not without complication, as it is not clear whether a contract analogy suitably describes sporting competitions. As Butcher and Schneider (1998, p.7) note, "Fair play as contract is open on the content of the agreement. On some versions of this

view, the content of the contract is created solely by the rules. On other versions, it is the rules as practised and understood by the athletes". This cautionary note on the application of contract theory to the drug situation in sport derives from a contested version of how morality is formed in sports and whether it comprises only the rules or the added notion of an ethos.[21] Following Eassom (1998), the social contract analogy in sport is not a sufficient basis to conclude that using performance modifiers, which are outside of the rules, is unethical. Consequently, the claim to unfairness on the basis of agreed upon rules, does not apply.

Nevertheless, on this view, rule-breaking is unethical because it is cheating the opponent and cheating is wrong because it treats the opponent as a means to an end, thus violating the Kantian maxim of respecting others. Even if this argument is credible, it cannot be used against GM because it is neither yet part of any rules in sport, nor likely to be reflective to any prescribed ethos.

When comparing drugs and GM, if there are any grounds for arguing that athletes collectively agree drugs should be used, then there is even less agreement that GM is not included as acceptable means. There is no basis for supposing there to be agreement between athletes that they will accept the genetic pre-dispositions they are born with when competing in sport. Indeed, if some world-class athletes were to find out that they are genetically disadvantaged, they might be justified to claim the use of GM to level the playing field. Any decision about this matter is premised upon an understanding about whether genetic variance is a factor that gives value to sports competitions or whether it is athletically irrelevant. If it is the latter – that sporting value is not supposed to be a test of genetic pre-dispositions – then GM to level the playing field would seem acceptable. If not, then sport would appear to be valued for the effort it represents rather than for genetic luck, though claims might also be sought to eradicate natural variation in genetics.

In the case of genomics, it would be easy enough – and expected – that sports authorities would simply place these drugs on the banned list without giving due consideration to their value of levelling any 'natural' genetic inequalities. Indeed, much

of the present discussion asks for a greater clarification of the bases on which such choices are made. Yet, even if genetic modifications were made illegal, to sustain the view of the athlete as a cheat, one must re-assess the concept of cheating as one that is independent of the actions of an individual. For example, on the conventional definition of cheating (the *strict liability* policy), the germ-line engineered athlete would be a cheat by virtue of having a genotype that has been augmented for competition. Such a disposition will have been afforded by a parent or guardian who chose to enhance this person's genetic constitution and having such a condition, would be outside of the rules. Yet, it would not be reasonable to label such a person as a cheat since they will have done nothing.

Subsequently, one might argue that it is the guardian who is responsible for the cheating that takes place. Yet, this kind of perspective makes problematic penalising the athlete or banning them from competition, since it seems unfair to punish an individual for something that is not of their doing. Indeed, the very manner in which justice and anti-doping are constituted is by targeting the guilty person. Thus, it seems unjust that an athlete be banned from competition if the reason for being banned is not their responsibility or the consequence of their actions. To argue such enhancement as cheating is not a reasonable position to take. Indeed, it does not allow for the genetically modified athlete to be treated fairly. This begs the question as to whether penalties should be directed at the intentions or resultant consequences of an athlete's actions; whether someone has intended to cheat or that something has taken place that has resulted in cheating occurring regardless of intentions.

In sum, the harms resulting from GM being unfair do not seem persuasively different from other kinds of inequalities that already exist in sport. Indeed, the use of GM might even tip the balance in favour of equality than render it further uneven. If GM does, however, make sport more unfair, then in response it might be claimed that GM is unacceptable because it only accentuates the inequality. Thus, although it might be disappointing that sport is already unfair, to make it even more unfair would be unjustifed. However, the arguments do not suggest that GM will make sport more unfair. At most, it will alter the kinds of athletes that are the most successful. The

discussion changes somewhat if GM is brought into the anti-doping list, whereby it is seen as illegal. From this perspective, criticisms of it as being cheating are more justified. However, to do so without due reason would be equally unfair and prejudicial to athletes who might not have a particularly good genotype. As well, the restriction of freedoms that would derive from prohibiting genetically modified athletes from competition would also be an unacceptable harm and, perhaps, far worse than the resulting imbalances in sport that derive from permitting GM.

Coercion: Finally, potential for harm arises for the non-user in terms of coercion. To remain competitive, it could be argued that the non-user would be forced into using GM and, for this reason, it would be unethical (Simon, 1984). Arguably, one might be inclined to construe the argument from coercion as 'health' in disguise. Indeed, Holowchak (2000) bases the main part of his argument about the unethically coercive technologies of steroids on the fact that they force other athletes to harm their own bodies. Yet, there are reasons for assuming that this is not sufficient to disqualify a performance enhancement from the acceptable means of attaining sporting excellence. After all, similar concerns are not articulated in respect of the amount of hours an athlete must train to be competitive, which is accepted as a necessary aspect of elite sport, despite it also carrying a similar health risk (overtraining). Within sport, it is accepted that athletes must train extremely hard, consume extremely strict diets, and make many sacrifices in other aspects of daily life if they hope to attain world class status. If coercion is health in disguise, then the argument seems to lack substance and it might be relevant simply to refer directly to whether the performance enhancement is dangerous for the athlete.

However, it might also be argued that GM is unacceptable because it is the *result* of coercion, which, itself, is inherently unethical. On this view, the important point is not that the method of performance enhancement is harmful. Rather, it has to do with the choice to use the enhancement having been made in a coercive environment, as opposed to one that is free (Houlihan, 1999). Nevertheless, the importance of health risk is a critical factor in the discussion about coercion, since this latter claim is much more problematic to substantiate. In order to claim that a decision is not made out of

independent, autonomous choice is rather difficult to demonstrate. In contrast, physical harm can be shown by scientific research. However, it is also important to note that, even in respect of the supposed physical harm that is inflicted by the use of some banned substances, the scientific research is unclear. Nevertheless, such information might be used as a basis for asserting a paternalistic justification to legislating about new technologies such as GM in order to protect the non-user.

In the cases of genomics, somatic cell and germ-line cell engineering, and genetic pre-selection, a similar argument can be made to conclude that their legitimisation would be coercive. As such, the strength of coercion has an appeal that is implied by each kind of GM. However, it is still difficult to consider that the coercive harm deriving from GM is different from the coercive harm of other aspects of sport. Thus, if one accepts that the elite sporting environment is already a coercive one, then it is not clear how the coercion that takes place as a result of GM is any different from the coercion that takes place as a result of needing to train very hard. Indeed, there does not seem a basis for concluding that they are very different – if coercion is, in itself, unethical. As such, the harms from coercion do not seem sufficient to warrant the rejection of GM from sport.

Other: Members of the Sporting Community

Harms that affect the sporting community can be articulated from a number of perspectives, though clarification is first needed on what constitutes the sporting community to understand the limits of this category. Within sports, Morgan (1994) presents the notion of a sporting community in the form of a *practice community*. Defined in this way, *practice community* draws upon a MacIntyrean concept of practices, which asserts that a practice is

> any coherent and complex form of socially established co-operative human activity through which goods internal to that form of activity are realised in the course of trying to achieve those standard of excellence which are appropriate to, and partially definitive of, that form of activity, with the result that human powers to achieve excel, and human conceptions of the ends and goods involved, are systematically extended (MacIntyre, 1985, p.187).

Morgan's categorisation has wrought some confusion within sports ethics as to what has been the ambition of this prescription. Arnold (1997) considers that the concept can be used to encompass the practice of 'sport' in general. Conversely, Eassom (1998) views that the definition provided by MacIntyre delimits that a practice cannot be sport in general, but is reflective of specific sports. Thus, Eassom argues that sport is not a practice but *particular* sports, such as golf, soccer, or basketball are practices.

Returning to Morgan's concept of practice communities, the problem of asserting the existence of a sporting community is more apparent. Accepting Eassom, it makes no sense to refer to a sporting community, as such an entity does not exist, because sports are so diverse. It is, perhaps, akin to referring to the community of human beings, who, by virtue of them sharing a species type might be perceived as being of a community. Aspirations for such a community might be admirable, though are somewhat ambitious and useless. Equally, in the present discussion the importance of whether specific sports or sport in general can be referred to as a community is not particularly relevant. Rather, it is sufficient to place the concept of a community in relation to sport as opposed to a community external of it (or them). Thus, Morgan's practice community is useful as it refers to those individuals who can be described as part of the sporting community and thus, have an interest in the condition of their practice. On MacIntyre's view, this entails a concern for the internal goods of the practice or those goods that are necessarily and exclusively tied to the practice. These goods are opposed to external goods, which, as MacIntyre explains, entail goods of property and possession such as financial benefits or prizes. Thus, in the context of the practice community, the following concerns can be raised about the prospect of GM.

Expectation disappointment

Schneider and Butcher (1998) describe that, in the context of drug use, the sporting community has an expectation that athletes will be drug-free and that harm incurred from athletes using drugs will be the realisation that they are not. The harm derives thus, from performances that are partly constituted by drug use, which collapse the value that is placed into sport by members of the sporting community. A solution they

consider is to remove the expectation and, consequently, to remove the harm. However still, Schneider and Butcher recognise that the spectators want a drug-free sport and that removing the expectation (legalising the drugs) is not a solution to preserve the value that is invested into sport. A similar case is more difficult to make in the context of GM, due to the ambiguity in what is legitimate in respect of technology. For example, the FastSkin swimming suit introduced by Speedo at the Sydney 2000 Olympic Games was not clearly unacceptable or acceptable. It could not reasonably be claimed possible to speak on behalf of what the spectators wanted to see and use this as a basis for claiming that they would or would not be harmed by the use of this technology.

In the case of GM, the claim is even more ambiguous. Currently, the possibility of genetically modifying athletes is not really in the public sensibility. Thus, to make claims about an expectation from the sporting community that athletes should be free from GM is not at all clear. Nevertheless, indications of this perspective are found in a number of speeches that have been made on the subject. Each of these tends to assert the similar view that sport should reflect the athlete's capabilities rather than any technology's. Wadler (1998, html) refers to George Will's claim that "Sport - and a society that takes it seriously - would be debased if it did not strictly forbid things that blur the distinction between the triumph of character and the triumph of the chemistry." However, this distinction seems rather tenuous to assert in the context of elite sport, which rarely champions the status of character over chemistry and these reactions tend more to come from key sports persons in world competition, than from other members of the sporting community.

Importantly, it is not clear that the various applications of GM *ought* to have a negative ethical connotation and thus, that their use could fuel this concern about cheating and marginalising the role of the human being. To genetically modify a human does not necessarily have a bearing upon the moral character of being human. Indeed, the claim to 'expectation disappointment' is subsequent to the moral evaluation of a technology. If GM is seen to be a relevant and important facet of elite sport, then there is no expectation disappointment when discovering that athletes have been genetically

modified. Consequently, the concern about expectations must succeed the discussion about whether GM is beneficial or not for sports.

Role models

It can be tempting to claim that a further harm to the sporting community would be that the acceptance of GM is unethical, as it might set a bad role model for young children. Indeed, such claims have been made in relation to other kinds of doping method, in particular drug use (Houlihan, 1999; Schneider and Butcher, 2000). Yet, although this might have strength in the context of drug use specifically, it is relatively weak in respect of other technologies. It is, after all, not particularly alarming for a child to see that an athlete is using a titanium tennis racket rather than a wooden one. This comparison suggests the articulation of an innovation as a socially situated technology is what makes it potentially harmful for children to see role models using it or not. In the case of drugs, parents are justifiably concerned about their children, if they aspire to be like the drug enhanced athlete because drugs can be harmful in numerous anti-social and physical ways (which also seems reflective of elite sport with or without drugs). A tolerance for drug use in sport, aside from the inherently dangerous health risks, is often linked to a more willing acceptance of using drugs in other contexts. However, in the case of, for example, a swimming costume, the negative connotations of this technology are far less clear. This identifies that the onus must be placed upon deciding whether, first, the innovation in question is morally problematic in itself. If the technology is not something that would set a bad model for children to use, then it need not be of harm to children that athletes use such technology.

In respect of GM, this potential harm does seem alarming although it still depends largely upon how the technology is first evaluated. Should the aspiring young athlete recognise that, to become the best in the world, it is necessary to be genetically modified, then concern might be warranted for the welfare of youths if they consider that they must seek whatever means are possible to become genetically modified. In a similar way to there being concerns about drug use, one might be justified in being concerned that athletes who are not born with a genetic advantage might seek any means to become

competitive in sport, whether or not they are safe. In this sense, then, the concerns about GM parallel the concerns of drug use.

Alternatively, for the young sports-fan, genetically modified athletes might cease to be role-models at all and this could have a conflicting effect. From one perspective, the concept of the elite athlete – performance enhanced or not – is not a particularly worthy role model. The elite athlete is obsessive, selfish, egotistical, and poorly educated, having a relatively imprudent approach to life by investing into a relatively short career life with little chance of securing financial reward. Alternatively, the elite athlete and sport in general, holds values that are worthy of aspiration, perhaps for similar reasons, particularly the notion of sacrificing long term benefits for short term, highly prized ambitions. If one accepts the former view and young people no longer perceive the athlete as a role model, then this might be more beneficial for the sporting community. Subsequently, this might place more emphasis upon the importance of sport for reasons other than competition, such as for recreation.

The ability of GM to alter the beneficial consequences of athletes as role models still depends, crucially, upon how the technology is evaluated in the first place. As such, it is difficult to speak clearly about whether GM in sport would be perceived as negative or not. Certainly, concerns arise about the misuse of GM by the young athlete and the potential harms this might have on their health. However, similar claims can be made about over-training harms and, on this basis alone, the rejection of GM does not seem justified.

HARMS TO SOCIETY

The inclusion of social harms that result from performance enhancing technologies is, again, different from the way in which Schneider and Butcher (2000) categorise the harms of doping. In their overview, they choose to include social harms as harms to

others *in* the sport community. Thus, their reference to the harms on children who are influenced by role models is used to argue against the tolerance of drug use in sport. In the categorisation here, it is considered that these children are a *part of* the sport community. As well, when the discussion is broadened to performance enhancement in general, social harms demand a category of their own, as they are not necessarily relevant to people who have a sporting interest.

Aversion Harms

An initial social harm deriving from the legitimisation of GM in sport is the potential revulsion that can be felt in wider society. As unlikely as it might be to conceive of sports authorities legalising GM, when society (more likely the medical community) in general does not agree, the merit of such a decision must be evaluated. After all, it is not necessarily the case that decisions about genetic research fall within the realms of what is acceptable at the public level. However, in some respects, the importance of public aversion to the use of such technology is a further harm that is important to consider. This harm is similar to the harm of 'expectation disappointment' in that the interest is to ascertain the degree to which a community deems the technology to be unacceptable. However, it is not a question of understanding the justification for the technology from a sporting perspective. Rather, the interest is to give due consideration to the feelings of the public about the use of genetic technologies in general.

Birnbacher (1998, html) argues that, too often, the significance of public perceptions are not given moral consideration because they are seen as irrelevant, due to their not being founded on coherent moral arguments. It is claimed that the persuasive aspect of public feelings is not (and ought not be) their logical coherence, which, when clarified, amount to an emotive response to new technologies. Rather, it is the very fact of them existing that gives them moral weight. In establishing the means to assess such moral weight, Birnbacher asserts that,

1. The emotional reaction must be sufficiently intense, sufficiently stable and sufficiently widespread to qualify, in want-regarding terms, as a valid objection against a practice that is otherwise unobjectionable on want-regarding grounds.

2. The actual and potential harm done by foregoing the practice felt to be unacceptable must be weighed against the "morality-dependent harms" (Honderich) caused by doing or accepting it.

Considerations of the reaction to GM in sport must thus, balance the relative benefits and harms of utilising such technology in co-operation with the public perception of these technologies, which also reflects harm of some kind. Since it is not yet clear how GM might be used in sport, such perceptions are currently difficult to assume. If the representation of doping and drug taking is some indication, then it is conceivable that GM will be seen as unfair and contrary to the ideals of sport, which will lend weight to the removal of GM in sport.

Technological Momentum

A further social harm deriving from technologies involves the resultant effect of rendering society less resistant to the negative implications of the technology. This concern has often been termed as *technological determinism* and refers to the tendency for technological innovations to be rather difficult to remove from society once they have been implemented.[22] For example, regardless of the harms that might have been found in respect of smoking, the use of cars, or nuclear arms, upon their being manufactured and employed in various capacities, technological determinism asserts that the removal of these technologies is incredibly difficult. Moreover, it argues that the technologies determine the patterns of behaviour. For example, in the case of space travel, it might be argued that the possibility of this technology renders a need or interest for society to continue investing into the technology regardless of the vast amounts of finance they require, which might be better spent on other social priorities.

A less extreme version of this term is *technological momentum*, which argues there to be a more reciprocal relationship between society and technology, which does not necessarily place control in the hands of technology. In respect of the examples already used, technological momentum recognises that society can determine the way in which

technologies are used and, thus, steer the regulation of them to social interests. For example, smoking can be heavily taxed so as to make it very difficult to afford, cars can be modified to become more environmentally friendly and restricted in speed to reduce automobile accidents. As well, the use of nuclear arms can be restricted by international agreements.

In respect of GM in sport, it can be argued that the legitimisation of this technology in competition can set a precedent for other applications of genetics. By permitting and even encouraging the use of GM in sport, society demonstrates less resistance to the idea that it is morally legitimate to use such technology. In effect, this can provoke a greater tolerance about a technology that, in some contexts, might still be objectionable. For example, the tolerance of genetic pre-selection or the use of somatic-cell manipulation could make it difficult to distinguish between what is ethically *unacceptable* and what is ethically *indefensible*. In sport, the legitimisation of GM might make it particularly difficult to support the rejection of other forms of doping that were previously considered unethical. In this sense then, GM could be said to be determining what is ethical in sport.

This kind of speculative argument, again, is rather difficult to substantiate and is not sufficient to draw any sound conclusion about the ethical status of GM in sport. If one accepts the technological momentum argument, then all does not seem lost. It would still be possible for sports to re-adjust to the detrimental consequences of legitimising technologies. Indeed, an example of this can be found in the development and mass production of carbon-composite tennis rackets (Brody, 2000). This technology, which has been partly responsible for the current dominance of the serve in men's professional tennis, is now being dealt with by introducing new kinds of balls to adjust to this effect, as was discussed earlier. Thus, while it would not have been possible to withdraw modern tennis rackets and return to wooden ones, the strategy has been to balance these effects with other technological changes.

Yet, difficulties arise in circumstances where governing bodies of sport must justify the rejection of some technologies over the acceptance of GM. If GM is legitimised in

sports, then it seems inconsistent to ban other kinds of performance enhancers that are of a similar kind. However, this kind of discussion is to be encouraged and GM can have the positive consequence of provoking greater justification in sport for what delimits the acceptability of performance enhancements. Alternatvely, it can be argued that the legitimisation of GM in sport can produce a coercive environment in respect of GM in general. As an increasing number of people utilise GM as a means to ensure an advantage in life for their children, then an increasing pressure is placed upon people who are against such technology to also engineer their children in a comparable way. This coercive argument is comparable to the case described previously of coercion for non-using athletes, though importantly speaks to the broader social community as well as athletes. It is not inconceivable that a couple might seek to provide their child a greater advantage in life by buying them a genetic upgrade, as they might spend money on a good education (Ayabe & Tan, 1995). Nevertheless, this sobering analogy does not seem much of a consolation in comparison to a future where one must genetically modify one's child for them to be minimally capable to engage in society.

Finally, harms deriving from new technologies are effected on the sports themselves in a variety of ways. Philosophically, this is a contentious claim, since it is questionable whether abstract entities such as sports or, for example, chairs or tables can actually be harmed. As Glannon (2001, p.10) notes, "only beings with interests can be harmed, and having interests presupposes the capacity for consciousness and other forms of mental life that defines persons." In response, it might be argued that the harm done is not to the sport, but to the ability of people to enjoy it. However, Butcher and Schneider (1998) make a case for concluding that sports can be harmed and that they are, importantly, different kinds of harm than are effected upon people. However, theirs is only one way of phrasing harms to the sport.

A number of the harms in this category are, again, explained in various capacities by the authors outlined at the start of this 'harms' section. In Schneider's and Butcher's (2000, p.195) categorisation, some of these kinds of harm are seen as perversions of sport, as

they are "somehow antithetical to the true nature of sport". However, their subsequent category of "unnaturalness and dehumanisation" seems misplaced, since it would seem also that an argument about naturalness involves an argument about what kind of entity is sport. To argue that, for example, drugs are unethical because they are unnatural, is to assert something about what sport is and to also conclude that, for example, drugs do not respond to this ideal. Thus, their categorisation begs clarification, even if it can be argued that they do clarify various positions in previous literature.

However, it has seldom been the approach for authors to derive a thematic and logical categorisation of these harms, as is being undertaken here. Moreover, such consequences of performance modification are not necessarily seen to be harms to sport. To some extent, this speaks to the tendency of ethicists to have considered harms deriving from performance enhancement in sport as related to substance abuse and the risk of biological or physical harm.

Yet, drawing upon these previous works, it can be argued that harms to sport also entail some challenge to an alleged integrity or nature of the sport that takes place as a result of implementing the performance enhancer. In various readings, a threat to sport's integrity is often phrased as being a challenge to some essential facet of sport. For example, Tamburrini (2000) includes the argument that performance enhancement "runs counter to the nature of sports competition" (p.209) as separate from harms. For Tamburrini, this idea states that the technology deprives sport of excitement and is incompatible with the idea of sports as contests between persons. Here, such a categorisation lacks derivation and seems motivated to respond to the various arguments that can be found in different articles about drug use and other controversial methods of performance enhancement in the sport philosophy literature over the last 30 years. Thus, it does not seem that the categorisation of these harms is given much consideration and it is argued here that the division of categories in Tamburrini and other readings does not suitably theorise the types of arguments that are used in relation to performance enhancing methods.

Although Tamburrini does make important distinctions between arguments about doping, the inclusion of the "essentialist argument" (p.209) as separate from others reveals a lack of awareness that many of his categories can be seen as harms to the sport. The argument that "doping is unfair" (p.208) is an argument about harm to sport, premised upon an idea about what is of fundamental value in sport. The credibility of the essentialist view has weakened over the years, though continues to be credited as having an intuitively plausible basis, though elusive it may be.

As such, the categorisation given here argues that each of the following ideas is based on an essentialist claim about sport. For example, the first of the following categories identifies a compromising of fair play as a harm to sport. It asserts that fair-play is a characteristic of sport that ought necessarily to be sustained and, if its role in sport is weakened, then there are reasons for concern. Thus, harms to sport, tend to be made against threats to characteristics of sport that give it value. This is not to reduce the claims to a straightforward essentialist theorising of sport, as there is no presumed exclusivism about these values. It is not that they are claimed as being defining of sport. Rather, argument is made in the sports ethics literature to claim why these normative guidelines have value for sport. It is suggested that the following harms to sport all have a common characteristic of them asserting some inherent value in sport. At least, these arguments have each been argued by ethicists as describing important values in sport. Moreover, to claim that sport is harmed by their being threatened is, for different reasons, an argument to assert what gives sport value.

Unfair Advantage

Gardner (1989) argues that, to utilise specific kinds of performance enhancer is to adopt means that are, not immoral, but inappropriate as their employment negates the purpose of the activity. Utilising the technology renders, what he calls, an unfair advantage over the sport. This view is also found in Simon (1991), who considers that advantages are unfair for sports if they make the activity too easy, less challenging, or if they reduce the level of skill needed to perform them. For each of these, it is argued that advantage is taken of important elements of the activity.

It is necessary to elaborate on this argument, as its claim is not without complications. What would it mean, thus, to have an unfair advantage over the sport? Leaving aside the epistemological dilemma of arguing whether a sport can be taken advantage of[23] and retreating to the less problematic notion of unfair advantage. It could be argued, as is suggested by Gardner, that to have an unfair advantage over a sport would be to effect a kind of action that would be in contradiction to the aspects of that sport that make it interesting, worth perusing, and unique. Such actions might be comparable to circumventing the prelusory goal of the activity (as articulated in Suits' (1973) conceptualisation of sport). Alternatively, Butcher and Schneider (1998) argue that this effect shows a lack of respect for the sport and its constitutive elements. It is akin to using a motorcycle in a bicycle race. The moral weight of this position is contingent upon recognising that players have some obligation to show respect to sports and thus, the point of challenging the view is to question whether athletes do have any such obligation.

In the context of GM, the advantage gained by using such means would seem unfair, only if sports were kinds of activity is where the *genetic lottery* is a valued facet of the competition. However, Breivik (2000, html) considers that this is not relevant to sport and argues that "everybody should have the same chance of winning". Thus, if one is born with a genetic predisposition that is not the most ideal body type for any given sport, this kind of person should still have the opportunity to be the best in the world at this sport – for their particular body type. In his critique of the role that chance plays in sport, Breivik concludes that "Winning should be based on the relevant skills, and be the result of the sport-relevant skills and behaviour of competing athletes. Therefore chance has no place in elite sports." While Breivik does not extend his conclusion to suggest whether GM would, thus, be a beneficial means of performance enhancement in sport, it does suggest that the use of GM would not collapse this important aspect of sport. As far as altering genes is concerned, there is no implied disadvantage incurred on the sport itself. To be genetically modified does not circumvent the test of a sport and the challenge of becoming an elite athlete. Equally, genetic pre-selection does not

alter any constitutive element of sport to an extent that one could claim it to be unfair, since it has no bearing upon the kinds of skills that are required to become good.

Rule Breaking

One of the most straightforward reasons for why specific kinds of performance enhancements are unethical is because they are against the rules. In particular, this argument is used in the context of drug use and is premised upon the idea that sport only makes sense if the participants follow the rules. From this view, it is argued as sufficient to know that something is against the rules to conclude that it is unethical. Such a view is most relevant in the cases of banned substances and other methods of doping, such as blood doping. The perspective is argued by Feezell (1988) who considers that using such means are unethical because, failing to play by the rules, is failing to play the game at all.

There is a relatively straightforward logic to this position that argues sport is necessarily comprised of arbitrary rules, to which it is necessary to adhere for the activity to have any meaning. As such, in the case of many of these rules, they are not questioned and a similar case should be made for those kinds of performance enhancements that are also banned, even if their justification is unclear. On this view, in a similar sense to why it is not questioned why a soccer team has eleven players, neither need it be justified why certain kinds of performance enhancement are not allowed. The position does not demand a justification for banning the innovation, as it is accepted as being for the good of the sport.

However, this position lacks conviction since, in accordance with Brown (1980), the proposed arbitrariness of rules in sport is not accurate. While it is true to say that the rules of any given sport could have been otherwise for a comparably playable game to have resulted, it does not follow that such rules could have been anything.[24]

In relation to GM, the argument of rule-breaking does not yet have relevance. GM is not yet within or outside of any rules. Consequently, if an athlete is currently using GM

to enhance their performance, then it is not accurate to say that they are harming sport, since the rules of sport will not yet have responded to these technologies. As such, the ethical issue must be whether they should be outlawed. As Brown (1980, p.18) argues in relation to drug use,

> Another question is if the use of drugs is ever unfair. Yes, if using them is cheating; if one contender uses them against the rules, but others do not. But why should we ever outlaw their use?

This is the question that underlies the current ethical dilemma in relation to GM. If, as Brown argues, there are grounds to claim that GM is unfair, then it can be made only on account of it being cheating, which requires for it to be against the rules. Fairchild (1991) makes a similar argument, claiming that the first question must be whether the innovation should be against the rules. As such, a rejection of GM based on present rules does not seem warranted here, which is also what makes GM particularly interesting to study.

Compromise of Internal goods

Within the last 10 years of sport philosophy, an attempt has been made to clarify an elusive nature of sport in relation to MacIntyre's theory of social practices and the role of internal and external goods. Earlier, it was explained how this approach to ethics can provide a basis for understanding how members of a sporting community might be harmed by technology. By extension, Brown (1990, p.72) argues that sports are "typically organized in terms of sets of rules that make explicit their purposes and regulate the means acceptable for achieving those purposes". As well, Brown recognises that a feature of practices is also "reflected in the typical relationship of novice to master" (p.73) where becoming an expert necessarily requires a process that is not easily attainable and requires time and commitment. Thus, in sport,

> the relationship is frequently between novice and coach and includes the transmission of skills and values through the careful application of standards of excellence, which are the product of the sport's own history and the coach's prior experience. It is submission to this learning and the standards that govern it that

> is a prerequisite to mastery, just as it is the ability to extend and enrich the practice's techniques and goals that is the mark of achievement (*ibid*).

Moreover, it is only through this process that one realises the valued aspects of the practice, or, as MacIntyre phrases it, the "internal goods" (1985, p.188). It is on this basis that it can be claimed how sport might be harmed if the internal goods are challenged. While Brown (1990) does not consider that much hinges on the external/internal division of goods, because they are so difficult to delimit, other ethicists have argued that this distinction can be useful to conclude what makes some kinds of performance enhancement unacceptable. This has been the case in relation to drug use, where it is argued that such enhancements are unethical on account of them prioritising individualistic values and for not being conducive to the promotion of internal goods in sport, which derive mainly from skill-related abilities (Schneider and Butcher, 1998).

In this sense, GM does little to promote internal goods insofar as it does not promote the attainment of greater skills. However, neither does GM *prevent* an athlete from attaining the internal goods of a sport. Though here there seem to be two aspects of the claim about internal goods: whether it *promotes* internal goods and whether it *prevents* their attainment. It would not seem that GM prevents the experience of internal goods, but neither does it promote the experiencing of them.

Upon this basis, and in the case of GM, it is important to clarify more precisely what constitute internal goods in sport. On this subject, MacIntyre is relatively ambiguous though includes such things as money, fame, power, and privileges as external as they serve to enhance an individual's status, which has little utility for the practice community at large. However, Brown (1990) recognises that the good of 'winning' must be a borderline case, because there are different kinds of winning that have different kinds of value. Winning, *per se*, is not a good that can be claimed as exclusive to a particular practice because its importance is thoroughly located in the kind of setting within which it is achieved.

The goods of being able to swim faster, jump higher, or be stronger, are equally contentious to prescribe, which renders it difficult to claim that performance enhancements are harmful on the basis that they do not promote the internal goods of sport. A clarification of this, thus, requires an argument to specify whether quantifiable achievements are internal goods in sport and whether their attainment is reflective of sporting virtue. On one view, it might be argued that the importance of breaking known limits is a valued aspect of any sporting practice and that the employment of means to achieve this is also in keeping with this valued ambition. Accepting that this way of articulating goods is plausible, it can be argued that GM – similar to drug use and other methods of doping – does not prevent the attainment of internal goods and could even promote them by allowing more extraordinary performances.

In contrast, the same might not be said of a technology that allows an athlete to be *skilful* without needing to train – as can be argued of Gardner's example of the U-groove golf clubs, which allow a novice player to appear more skilful. However, the distinction between this example and the example of drugs is unclear. In the case of drugs, it might be claimed that they do also allow an athlete to be more skilful. A long distance runner using epo to boost the production of red blood cells and enhance endurance capabilities is boosting the necessary skills of running. Thus, the distinction between this and the U-groove golf clubs might be founded on false premises. On this view, using performance enhancing technology to make the attainment of endurance capabilities easier would, indeed, be a negation of the internal goods. As such, it would seem that the potential harm deriving from GM in relation to the internal goods argument depends wholly upon an articulation of the internal goods that are specific to any sporting practice.

Unnatural

The argument of naturalness claims that certain methods of performance enhancement are unethical because they are unnatural. The argument is premised upon a distinction between what is natural and unnatural and stipulates that unnatural technologies should *not* be used in sport. The position reflects an early discourse in the philosophy of

sport in relation to drug use, which has been vigorously critiqued in recent years. The basis for this critique is twofold and can be summarised as:

1. The naturalistic fallacy response
2. The consistency problem response (that if naturalness is the condition then much of what we assume to be acceptable in sports is also unethical) (Lavin, 1987; Parry, 1987; Perry, 1988)

The naturalness argument lacks credibility as it consists of the invalid argument that what is the case, should be the case. It first makes the ambitious claim that human performances in sports are natural and follows with the equally ambitious conclusion that they should remain natural. Consequently, anything that is outside of this natural order is to be deemed unethical. As such, the argument moves from an 'is' statement to an 'ought' statement, which has no logical foundation according to Moore's (1903, cited in Pigden, 1993) *naturalistic fallacy.*

The unnaturalness argument is also considered to be weak since it has definitional problems. As Schneider and Butcher (2000, p.196) summarise, "we do not have a good account of what would count as 'unnatural' and...we are inconsistent". As Brown (1980) argues, the basis for concluding what kinds of substance are natural is infinitely difficult to apply. Inevitably, a definitional approach to banning substances in sport leads to the inclusion of other kinds of products that are recognisably conducive to good health. There are very few substances that do not alter the performance levels of human beings and thus, to conclude some as unacceptable on account of specific characteristics, serves only to provide an arbitrary system of differentiating between substances.

Brown considers whether the conditions of the substance being of a 'chemical' nature, or 'not normally present in the body' or even the 'quantity of the substance' are sufficient as a basis for concluding which kinds of substance are unethical in sport. However, on all counts, the conclusions lead to an untenable system of acceptance and rejection that does not help in concluding the ethical status of, for examples, "blood doping, adrenaline injections, testosterone supplements, or hormone additives" (*ibid,*

p.18). Even within anti-doping policy, the basis of naturalness is no longer a justification for banning specific methods or drugs from sport (Houlihan, 1999). Nevertheless, if there is any credibility left in the argument about naturalness, then it is worthwhile to consider whether GM is equally unethical for the same reason.

To assist in this discussion, a similar question has been asked in bioethics, particularly in relation to reproductive technologies, such as in-vitro fertilisation. While in-vitro fertilisation is not considered by some as a 'natural' method of procreation, the resulting entity is most definitely something that is of the natural world – a human (or animal) life. Equally, it could be asked in what sense a human life that is conceived and born by natural means, though who might have been genetically modified to some degree, is also unnatural. In this case, it is uncertain whether genetic engineering serves to determine the natural or is itself unnatural given the close proximity to conception that such technology would be used. It is tempting to tend towards the former and argue that genetic engineering is natural since it is merely a difference in degree to how one's genotype is determined by conventional means.

The conclusion to such questions depends upon where one draws the boundaries of intervention and causation as determinants of what is natural. If the sole criterion of naturalness is the conception of an embryo through heterosexual intercourse, then one must accept that many kinds of life are unnatural. Thus, the production of test-tube babies, surrogacy, and perhaps even pre-natal interventions, all lead to the conclusion that the resultant life is unnatural. Furthermore, the basis of concluding that heterosexual intercourse is natural is to purport a somewhat narrow perspective upon what can be natural to human beings. Such a view might also lead to concluding that individuals wearing spectacles or fitted with pacemakers are unnatural. Importantly, the significance of making such conclusions is highly questionable.

The claim to GM as being unnatural is highly contingent on the kind of modification under discussion. For genomics and somatic cell modification, which entail manipulations on the adult (or at least, fully developed) human being, the claims are probably at their strongest. The argument considers that tampering with the biology of a

human being is unnatural and, as such, ought not to be done. The basis for this position varies, though includes a concern for 'playing God' and the consequences this might have for the human species. As well, it is argued that sport is an activity that is valued because it is a human performance, which stands opposed to anything scientific or technological.

Because genomics and somatic cell alteration take place so late in the life of a human being, it is quite true that it entails tampering with the human body in a way that alters its biological condition. In this sense, it is unnatural inasmuch as it consists of using scientific technologies to bring about physical changes. Nevertheless, a similar case can be made about other factors that affect the performance of an athlete, such as diet, vitamins, sleep patterns, and so on. Regardless of the inadequacy of these distinctions, the cases of genomics and somatic cell manipulation are no more or less unnatural than drug use. However, in the case of germ-line manipulation and genetic pre-selection, the situation is more complex.

Germ-line manipulation entails altering the individual very early on in life. Currently, legislation does not recognise the moral significance of the embryo until 14 days after conception (Warnock, 1987). Until then, the embryo is afforded only minimal moral significance and is not considered to be a life that can be treated as if it were a fully formed human being. As well, germ-line alterations must be made within days of conception for them to be safe and effective. With these two considerations in mind, it can be questioned whether germ-line alterations do actually interfere with the naturalness of the embryo. If it is not afforded 'life' status until after 14 days, then there might be a case for claiming that the natural life begins at this time and any interventions before then are negligible (in terms of identifying what is natural). Thus, anything taking place before this period might seem so early in the development of the embryo that it is an integral part of the life-forming process. Consequently, one might claim that germ-line manipulation, contrary to drug use, is a natural method of performance modification.

In the case of genetic pre-selection, there seems no relevant claim to it being an unnatural process at all, as it does not involve tampering with the human being. Thus, the claim to unnaturalness - not withstanding the critiques given above - seems plausible, at most, with respect to genomics and somatic-cell engineering.

Not an earned advantage

A further argument for how performance enhancements harm sport is by them providing an *undeserved* advantage for the athlete. For example, by using drugs or a more sophisticated golf club, the athlete is afforded benefits to performance that derive from the technology and not their own efforts. This is unethical since the value of sport is premised upon the attainment of excellence being through effort and hard work. Again, this view seems reflective of MacIntyre's social practice theory, which recognises there to be an important element of a practice relating to the relationship between the novice and the expert. It argues that, if being excellent in sport were easy to achieve, then it would have little value. Thus, technologies that collapse this process of becoming an expert, challenge the way in which one should participate and learn sport.

Therefore, performances that use these kinds of innovations and that render the difference in results determined by machines rather than humans, ought not merit praise (Carr, 1999). Underlying such reasoning are two different ethical assertions. The first is that, only those methods that are derived from the work and efforts of the athlete are justifiable methods of performance enhancement, because only aspects of an athlete's struggle and sacrifice are what gives sport value. Second, the idea is premised upon a distributive theory of justice that claims people should get what they deserve. A response to these two perspectives, thus, requires answering the following questions

1. Is it the case that only advantage deriving from effort and hard work has value in sport?
2. Is it the case that everyone gets what he or she deserves in sport?

For each of these, the harm done to the sport is in keeping with the theme of this 'harms to sport' section and consist of circumventing the relevant challenges placed

before an athlete in sport. However, different from the other categories, the approach tends towards asserting that value in sport is defined by the characteristics of *being human*. Each is an argument that stipulates sport has value because it involves the evaluation of human-centred characteristics, rather than technology-centred ones. The difficulty of being able to identify the human in sport is dealt with more substantially in the latter section on 'dehumanising and superhumanising' effects. However, it is possible now to assess whether sport performance is premised upon meritocratic principles and how GM responds to any such claim.

In relation to the former question, Carr argues that merit is all that is relevant in the evaluation of sporting performances. Where luck, chance, or factors that cannot be attributed to the performer determine results, then it is foolish to champion the athlete as being excellent. This perspective does encounter problems when faced with distinguishing where the athlete stops and where the technology begins, as in many sports the performance would seem to be a combination of both. Perhaps a modified position is to argue that any innovation that provides a capability that the athlete otherwise would not have, is not something that can have value for sports. This limitation fits well with innovations that must be appropriated into the skill patterns of an athlete and thus, which require training and effort to master. For example, the FastSkin swimming suit might only provide a performance advantage if the swimmer learns to adjust to the technology and master its benefits by adapting their swimming style. In these cases, perhaps Carr would accept that these innovations could have value for sport.

However, this conclusion seems counter-intuitive as it leads to the acceptance of technologies that are, perhaps, at the core of Carr's criticisms. In the case of drug use, a great deal of work must take place to ensure one has the correct balance of substances to render a performance advantage. Moreover, the athlete must invest a great deal of risk into using such drugs. As such, it is not accurate to conclude that the athlete does not need to work hard to receive a benefit from taking drugs. Consequently, if one rejects this conclusion, then a modified conception of merit must be asserted. Yet, this is

where the argument about 'earning' one's advantage seems incomplete, since the drug-enhanced athlete can still claim to have earned their advantage.

Additionally, the notion that sport consists of an enterprise where people (in this case athletes) get what they deserve hardly seems accurate, though the aspiration might be admirable. The structures set-up in competitive sports are not there to ensure that goods are distributed justly on account of what each individual has invested into the activity. At best, the relatively objective performance measures serve only to reflect the athlete who has trained the hardest, though even this conclusion is rather questionable. Sports performance outcomes are not at all sensitive to the investment and sacrifice that each athlete has placed into their own performance. There is no account made for individual, cultural differences that must be used to assess people from different backgrounds. Rather, sport seems more about who can become the best with the means available to them. In this sense, it is not accurate to say that athletes get what they deserve. An athlete's performance is comprised of many chance circumstances within which they have been born and raised. Additionally, the argument must include the ability to take the opportunity to maximise these opportunities for which one can rightly ascribe a credit. However, this does not lead to the conclusion that sport consists in ensuring that athletes get what they deserve. In cases where sport does nothing to reduce indifferences of background and privilege, a similar argument for why this is not done might be made in the context of any new technology.

In relation to GM, it is crucial to consider each kind of application separately. In the case of using genomics of somatic-cell GM, the athlete makes some kind of investment into the technology that might allow one to conclude that they have earned the advantage. Suppose that utilising such methods of performance enhancement involves taking a similar amount of time as might be invested into endurance training. Alternatively, suppose that the athlete must enter into a very strict diet for the modifications to have any benefit. Here, it can be argued that the athlete must undergo a regime that makes it difficult to sustain the 'unearned advantage' argument.

In the case of germ-line modification, if there is any sacrifice, risk, or hard work undertaken, it is from the perspective of the modified human's parents, most likely the biological mother. The athlete will not have earned their competitive advantage and so, if there is any strength in the claim to 'earned advantage' as a measure for legitimacy in performance enhancement, then it seems relevant here. However, the question must then be asked whether it is legitimate to penalise an athlete and ban them from competition on account of having a particularly good genetic predisposition. A comparable example that can reveal the problem with concluding that earned advantage is any basis to reject GM is found in the case of the 'gifted child'. For simplicity, suppose that a child is born to basketball player Michael Jordan and runner Cathy Freeman, who fell in love one day at a mixed basketball game between NBA veterans and Sydney Gold medal winners. Their resulting child, like many children, decides to follow in the footsteps of its parents and become an athlete. Neither of the parents is pushing Cathy Jr to become a basketball player or a runner, though Cathy Jr seems to be very good at high-jump, with her father's height and mother's strong legs.

Arguably, this image is appealing and many fans of Michael or Cathy would probably be very pleased to see their child participate and excel in sport. At most people would take pleasure in seeing such an admirable couple parent an excellently gifted child. At no point would people seek some compensation for the athletes who have not been so fortunate to be born to two particularly gifted athletes. Nevertheless, this child – nor its parents – did anything to earn this advantage. Moreover, it is very likely that they will have done much less than would parents and prospective children who are using germ-line modification to gain a similar result. At least, the parents of genetically modified athletes would be forced to make difficult choices and make a financial commitment to private health care. Thus, on the basis of earned advantage, germ-line genetic modification would actually seem more desirable than a couple of elite athletes giving birth to an exceptionally gifted child, as it would entail some moral evaluation of character.

Finally, in the case of genetic pre-selection, the claim to an unearned advantage does not seem applicable. At most, the young athlete is given an opportunity that they might

otherwise not have had, if the talent identification processes had been dependent upon trials, and where the athlete did not perform well on the day. Equally, it might transpire that genetic pre-selection precludes the opportunity for a good, hard-working athlete to become elite, simply because their genes are not good enough. In this case, the selected super-child might receive an undeserved advantage since their being selected might have nothing to do with the effort they have already invested into sport.

In sum, it is important to recognise that GM does not guarantee or determine excellent physical capability and to be aware of the dangers of genetic essentialism. However, such recognition can lead to conflicting perspectives about the acceptability of GM, both of which can be misinformed. If one concludes that GM is unethical because it will turn athletes into genetic-machines whose performances are solely the product of genetic engineering (yielding to genetic essentialism), then this would be mistaken. Equally, if one considers GM to be ethical because they do not guarantee elite performances (rejecting genetic essentialism), then this also presents an incomplete argument. One's genetic disposition does not guarantee that one will be capable of elite performances in sport. It is not possible to become an elite athlete by virtue of genetic characteristics alone. Rather, an athlete must hone these 'gifts', train hard to compete and endure all that the unenhanced athlete would need to become elite. As such, the genetically modified athlete will still require the qualities of excellence associated with character that derive from training hard, however these might be articulated. The GM athlete will have to earn the benefit of their modification.

Summary to 'old' harms

These 'old harms' reflect the reactions within sport to the possibility of using genetic modification. They reveal what kinds of harms might ensue for relevant and interest parties or from the perspective of the good of a practice or community. However, they do not provide any indication of other kinds of harms that might derive from using GM. As such, the following section will detail other kinds of harms in relation to GM in sport that draw upon literature in bioethics to support the claims. It is important to note that, in so doing, it is distinct from what have been termed as the 'old' harms of

GM for sport, which have been premised upon ethical implications from the sporting perspective. Thus, what is stressed in this harms discourse, is a need for recognising the inter-connectedness of issues in bioethics and sports ethics to reach a conclusion about the ethical status of GM for sport.

The new harms of legalising GM

Categorising 'new' harms arising from GM has rather a different approach than the 'old' harms. In this sense, it is more difficult to discern harms to the athlete from harms to others, as it is more difficult to separate harms within sport and in society more generally. Moreover, the focus of these harms is deliberately tangential to sport, though the implications are made explicit and phrased within the context of the sporting examples. Nevertheless, as is the case with genetics more generally, these new harms speak more to broader social harms than to sporting ones. However, the categorisation is tentative, and endeavours more to relate to the previous categorisation of 'old' harms than to serve as a definitive guide. Arguably, the implications of GM are so varied that it makes little sense to identify specific groups that are harmed. For example, the harm of discrimination that might result from GM would seem both a harm to the individuals who are the subject of discrimination as well as to society at large for instilling a tolerance of such discrimination. Where possible, these different kinds of effect are integrated though the problem is inherently over-lapping.

BOUNDARY HARMS: THERAPY VS. NON-THERAPY

Although it remains contested (Pandya, 2000), if it is ethical to use GM for therapeutic purposes, the merit of GM for non-therapeutic purposes is highly controversial and, currently, unanimously condemned from the medical community. It is important not to confuse the distinction between therapy and non-therapy with the distinction between repair and enhancement. It is not that non-therapeutic applications of GM are similar to, what might be termed, genetic enhancements. Indeed, a much stronger argument must be made to support the use of GM for enhancing purposes, where already strong arguments are necessary to justify GM for non-therapeutic reasons. Given that some of

the arguments in relation to GM for sport are for enhancing purposes, it is important that this significant ethical barrier in medicine is clear, though its justification must be sought.

One of the major concerns with non-therapeutic GM is that it will engineer, what might be called 'social' genes rather than biological ones. The case of sex selection is a particularly good example and would entail screening for the sex of an embryo so as to determine whether it is of the preferred kind. Further examples might include skin colour, eye colour, hair length, or body size. The resulting harm of this would be its eugenic nature, which implies reducing the value of specific kinds of people. Macer (1990, html) goes as far as to say that non-therapeutic alterations should be illegal since there is already a shortage of resources. Additionally, he argues that

> if we let society or parents chose characters in their children then it will have a harmful affect on social attitudes to people who fail to meet those characteristics....genetic screening...makes life more difficult for many parents and their children who suffer from the disease, who did not use screening.

Recently, the example of sex selection has arisen as a present ethical dilemma in medicine and it is argued that legitimating the genetic engineering of such genes would condones a level of discrimination that is unacceptable. In this case, such discrimination takes place by the prioritising of a given sex over the other. Unfortunately, rational discussion of the issue has been overshadowed by emotive (and poorly articulated) concerns about the sexual bias that might result from such choice and the frivolous treatment of life that might ensue from allowing it (Benn, 2001). The strength of the arguments seem to hinge upon deriving 'good reasons' for wanting to make any such selection. If the choice is based on a perceived difference in the importance of one sex over another, then there would seem reason for worry. However, the position seems less strong when it premised on a non-sexist rationale. For example, a couple might have already had four births of one sex and seek to have an alternate sex for their fifth child. It is easy to be sympathetic to this perspective and it would not seem to raise any serious moral concern about the devaluing of certain kinds of life.

Nevertheless, the significant harm arising from this choice and other non-therapeutic modifications is that it could provoke an horrific abuse of the treatment of life, since it is inherently eugenic. There are concerns that particular kinds of people might be deemed to lack value simply on account of seemingly trivial characteristics. As Elliott (1998, html) explains,

> One possible worry about some enhancement technologies is what the Georgetown University philosopher Maggie Little calls the problem of "cultural complicity." The demand for certain technologies is created by cultural forces that many of us would see as harmful. They are harmful because they make some people feel inadequate, or unhappy with the way they are. One example would be the desire of some Asian girls and young women to have surgery in order to make their eyes look more like those of Westerners. Another more obvious example is the pressure that many American women feel to conform to a certain body type, and which leaves many women and girls feeling that they are too fat, or that their breasts are too small, and so on. At the extreme end of the spectrum these cultural pressures help to produce psychiatric illnesses like anorexia nervosa.

Ensuring that prospective parents have a 'good' reason for wanting a child of a particular sex might be particularly difficult to ensure, though pragmatics does not seem a justifiable reason for prohibiting such choices in such important matters. Conceivably, a system of counselling could be arranged and qualitative procedures of evaluation of each case might be sufficient. In such circumstances, at least the responsibility is taken by the medical community to ensure that not any reason is considered a good reason for selecting a particular kind of life over another. As a further concern, it is imaginable that couples will manipulate any such test, simply to have a desirable outcome to any evaluation. Thus, when asked about the reasons for making a non-therapeutic modification, candidates could disguise their prejudice to present socially acceptable rationales. However, this is their responsibility and need not raise any more of a dilemma from the medical community. In relation to sport, it is perhaps now clearer how difficult it would be to legitimate such modifications. To utilise screening for the intention of discovering athletic capability seems an horrific abuse of the technology and highly unethical.[25]

Similar claims can be made in relation to other applications of GM. To engineer specific kinds of genes, or to remove specific kinds of dysfunction is inherently eugenic.

Even seemingly desirable modifications, such as the correction of genes that lead to very difficult or painful lives, the choice to use such technology is a choice of preference for one way of being human over another. As well, to ask for a justification of anyone who might be seeking to engineer themselves would also be problematic to apply.

In sum, this section highlights the potential for harm that might ensue from allowing genetic manipulation or screening for non-therapeutic purposes. Regardless of where the line is drawn on therapy and non-therapy, harms will arise. Thus, the couple that seeks to have a boy as their third child, rather than a girl, would be harmed by an infringement of their freedom to exercise such choice, if it were prohibited. From a consequential perspective, this harm might seem more desirable than the many harms that derive from legitimising such choices. However, it is also alarming that the legitimate use of gene-therapy might lead to a greater tolerance for gene-enhancement, which itself might be an additional harm.[26] Indeed, restricting the use of such technology can also be argued as eugenic. By *not* allowing individuals to make their own choices about their children is also to enact an institutional stipulation about what kinds of people should exist. In this case, the eugenic premise is that, 'only people who are not genetically modified should exist.' Consequently, if the criticism is that GM is inherently eugenic, then it must be asked why that particular form of eugenics is less desirable compared with the alternative, which forbids such people from existing.

KNOWLEDGE AND ACCESS

The implications of genetic selection (as opposed to pre-selection), which would derive from 'genetic-screening, are such that the screened individual would have an awareness of their genetic predisposition. In bioethics, this has been particularly relevant for knowing the probability of contracting certain kinds of gene-related disorders, which has extensive uses (Macer, 1990). The identification of 'sport' genes has still a long way to go before it gains any kind of acceptance as a legitimate application of medical technology. Nevertheless, the potential for harms in this section is comparable.

Within bioethics, knowledge of one's genetic future has been discussed in relation to the harms that might derive from having such information. Questions have been raised about whether it is conducive to health for a patient to be aware of their genetic future for a number of reasons. For many kinds of genetic disorder, there is no possible therapeutic cure and so, arguably, it makes no sense to conduct such tests (Ayabe and Tan, 1995). As well, for some kinds of disease, genes are not the only determinant of contracting an illness. In such cases, it has been argued that knowledge of the possible condition might be to the detriment of the patient's health and might actually increase the tendency to contract the illness, somewhat of a self-fulfilling prophecy.

Similar arguments are raised in regard to the patient's family, whose health might also be affected by such knowledge (Häyry and Lehto, 1998; Macer, 1990). Ethical questions arise over whether family members or reproductive partners have a right to such information. An illuminating and relevant case is found in Macer (1990). Macer describes the case of trying to enforce married couples in Illinois, USA, to undergo mandatory premarital testing for HIV. As Macer explains, the premise was that "the spouse should know if the partner has HIV, and the public health motivation was to slow the spread of HIV." Macer continues, "however, it is ethically unacceptable to enforce such screening" (html).[27]

Ethical issues also arise in terms of who should be given access to genetic information. The potential harms of this also derive from screening and selection, but also from other kinds of GM. However, currently the main concern in respect of this is screening as this application has the most likely utility in sport. Recently, this has become manifest in the context of the rights of insurance companies to have knowledge about the genetic constitution of the people that they are insuring. Before genetic screening was possible, companies could not claim a right to such knowledge. However, the possibility of the technology being used has provoked a claim to the right of an insurance company to request such information. In such circumstances, the individual will be condemned to know their genetic future and might even be prejudiced on account of a negative prognosis.

In the case of sport, the parallel case would be that sports authorities demand such information under some kind of anti-doping rationale. In this case, similar questions arise for GM as have arisen in the case of other kinds of performance enhancement. Whether an athlete is obliged to provide such information or whether the sports authorities over-step the athlete's rights by making such claims, is at the core of this debate. On account of the bioethical reasons for preventing a tolerance of the rights of insurance companies, it does not seem necessary that a simple argument can be made to support athlete's rights. However, it is likely that genetic testing would be limited to test only the kind of information pertinent to an athlete's performance in competition. As such, they would not be harmed by any other information that indicates future disorders. Nevertheless, the question must still be asked as to whether an athlete is obliged to undergo any such test and how this compares with other kinds of professions, where such demands cannot legally be made.

Research has examined the possibility that employers would also have an interest in the genetic prognoses of their employers, in a similar way to how other kinds of medical information is required (Rothstein and Knoppers, 1996; Shapiro, 1991; Henderson, 2000). In this respect, the harms can vary. For example, it would be particularly useful to know that if one is a haemophiliac, then a butcher's job is not the most ideal career choice. However, this is one very simple example, where others do not make such a clear link between a given kind of profession and the importance of genetic conditions. As well, it is less clear whether information would be used, predominantly, in the interests of the employee or the employer predominantly. In either case, it is possible to sympathise with the concerns, though arguably it is the individual that would suffer more from others knowing their genetic prognosis. A further reason for doubting the merits of such testing is that it would be prejudicial to those for whom a genetic disorder can be identified. Where the technology does not detect other kinds of disorders, those who might be susceptible to these are favoured – their genetic dysfunction is not noticed. Thus, the unrestricted use of genetic information poses a threats to the exercise and enjoyment of human rights (Hendriks, 1997) and would seem to create concernes if applied to sport.

ENGINEERING FUTURE VALUES

Embracing GM in sport would, indirectly, result in harms to society in the sense that they determine what is to be valued by future generations. As Mackie recognises, "if the Victorians had used genetic engineering, they would have made us more pious and patriotic" (Mackie, cited in Glover, 1984, p.149). This exemplifies the concern for what is alarming about allowing any use of germ-line genetic engineering. By prioritising performance-related characteristics in sport, one asserts a hierarchical framework for organising the value of various human characteristics. The emphasis is placed upon winning, being successful, and having an advantage over others. Being prepared to alter oneself to fit within such a framework of value is harmful to society because it instils a prescribed way of evaluating life.

For example, Munthe (2000) assumes that genetics would be used to make athletes faster, higher, and stronger. Thus, it is performance enhancement – in the quantitative sense – that is most interesting in relation to genetic technologies. Munthe does not consider that genetics might be used to make athletes play more fairly or to be interested less in winning and more interested in acquiring altruistic tendencies and learning the value of, for example, team spirit. In response, it might be considered that the biological traits are the most likely traits to be altered by GM. Of the many ways in which future genetics might be used, it does not seem inconceivable that genes will be identified as determining various kinds of physical and psychological traits. Yet, accepting that genetic pre-dispositions are no more of a guarantee for becoming an elite athlete than they are for becoming an alcoholic, it would be unfair to suggest that emerging research that outlines possible genetic determinants for socially learned traits is not significant. It does seem possible that social characteristics could have some demonstrable genetic origin, at least in some cases. As such, Munthe's discourse reflects a particular ideal of sport, which is also reflective of taken-for-granted values in sport: those of performance and physical, quantifiable, achievement. Yet, it is the very content of this sporting ideal that is in need of question.

As well, it can be argued as harmful to prescribe what must be valued by future generations. To engineer or enhance certain characteristics of an athlete is to assert

these characteristics as being the most valuable in sport. This prioritising of quantifiable measures of performance results in an emphasis upon specific kinds of characteristics, to the neglect of others. While this process of evaluation might be reversible in some cases, there seems something problematic about instilling a particular set of values in sport for future generations as might be said of GM. This harm is particularly strong in the case of germ-line cell engineering, which can be argued as altering evolution by engineering the genes of future generations. Additionally, there is also the potential for negatively affecting the human gene pool and a general equilibrium in nature. As Glover (1999) argues, germ-line gene therapy can be seen as, not just curing a disorder in one person, but also as changing the gene-pool. However, in response, Macer (html) claims that the argument of genetics as reducing genetic variability

> ...is doubtful as to whether this sort of selection would really have much affect biologically. The major affect is on reduced social variability. If we want to maintain or should we say develop a society where people's autonomy is respected then we should not allow the acceptance of genetic restrictions on non-disease characteristics. This means that society could for the benefit of society, and protecting its members from developing narrow views whether they be sexist or intelligence seeking, restrict the freedom of individuals to use techniques to affect the children. We already limit the environmental freedom of parents, we also need to limit their genetic freedom to chose.

Even if Macer's view is more accurate, engineering humans to become better athletes – quantitatively – prevents aspiring to other values in sports, which is harmful to the possibility of freely choosing what matters to people.

TYRANNY OF THE NORMAL

Macer's ideas lead to a further harm that can derive from a liberal tolerance of using GM to alter humans. Arguably, from a liberal acceptance of GM, a process of normalisation (comparable in effect to institutionalised eugenics), is affected upon society. Expectedly, the cause for such normalisation will be different from an attempt from government to bring about specific kinds of persons. Rather, it is more likely that fashion and popular trends will lead to what is termed by Post (1991, p.225) as "the tyranny of the normal." Post continues, explaining that it is

> imperative to consider the possibility that our cultural definitions of normalcy might shift so that enhancement genetic engineering becomes increasingly attractive....Our desire not to bring suffering into the world must be tempered by a recognition that suffering is a part of life (*ibid*).

The probability of this occurring has been discussed in depth by Appleyard (1999) where it is considered how eugenic issues might not arise simply as a result of institutionalised eugenicide that might be comparable to Nazism. Rather, the tyranny of a liberal society where individual autonomy is prioritised and where people can choose how their children are brought into this world, can also have a comparably pessimistic ending.

This would have, Appleyard suggests, a normalising effect upon people's choices about their children that is as destructive as institutionalised eugenics. Thus, when acting in the interests of their children-to-be, parents would seek to determine those characteristics that will render the child more predisposed to social acceptance and endeavour to remove those characteristics that might lead to social exclusion or, less dramatically, the possibility for ridicule. As Appleyard (1999, p.86) says, "people in general are powerfully driven to gain a competitive advantage for their children or, at least, to ensure that they are not at a competitive disadvantage." In this sense, the ethical issues arise from learning that legitimising GM would lead people to engineer their children to be alike. In so doing – by eliminating difference – future generations are not burdened by the social injustice of being 'different', but by the, perhaps, greater burden of 'sameness'.

Appleyard's argument comes as a response to advocates who argue modern genetics to be entirely different from institutionalised eugenics, such as Ledley (1994) and Glover (1999). Appleyard's retort is that, while the method might be substantially different, the effect would be similar, and this is cause for concern. The possibility that difference could be removed from society seems quite contrary to a democratic, multi-cultural society, which continually seeks to embrace and nurture difference and where tolerance and morality is predicated on having to make a conscious decision to accept and embrace difference. It requires, as it were, the capacity for being an autonomous, moral

agent. While difference might not be inherently valuable, it can be argued that difference makes for a much more interesting existence and the prospect of similarity in physical and mental characteristics is alarming since it seems to reduce the value of being human by eliminating chance. Moreover, reducing difference may be argued as problematic given that it would seem that tolerance and co-operation are learned only by being required to accept difference.

In sum, the widespread acceptance of enhancement technology would render an homogenising effect on the human species, where parents might select their children to ensure their normality and acceptance into society. Parents will seek to enhance those qualities that are culturally desirable and, consequently, genetic engineering becomes a mechanism of eugenics, even though it is left to the free will of individuals. The alarming scenario is presented whereby all humans might look, think, and behave alike, thus perpetuating the disturbing situation where human autonomy is removed and people cease to be individuals, unique, and creative. Within sport, this argument is relevant for it projecting a future for sport that is determined by present-day values.

GENETIC ESSENTIALISM

A further concern with GM is that it will lead to an investment of interests based solely upon genetics, when genetics is only one element of what constitutes the capabilities of a human being. Some authors have recognised that the genetics is already instilling a powerful essentialism that can be highly detrimental (Nagl, 1998). Neither the human being, nor the elite athlete is constituted entirely by genetics. Thus, to place so much importance upon genes would misconstrue the relationship between nature and nurture, to the expense of the latter (Elliott, 1999; Macer, 1990). In turn, this is harmful for it reducing the rich contexts of sporting performance to enterprises that place value *only* in results and performance rather than, for example, strength of character. This is alarming from a social perspective since it purports to reduce human practices to levels of quantifiable measures and impoverishing social experiences.

Ayabe and Tan (1995) explain how, in relation to 'knowledge and access' harms, genetic information can render an essentialism that leads to discrimination based upon genes. Indeed, Keyley (1996) illustrates these concerns by way of an example of the legal system in the U.S. Recently, custodial cases in family law have been re-defined by genetic essentialism. As Keyley describes, "Under the rubric of 'genetic essentialism', the family is being redefined as a 'molecular, genetic unit' and social/psychological aspects of family identity and functioning are being ignored" (p.717). Within sport, the implications of this are alarming for the very reasons that are given *against* the importance of performance-enhancement: the championing of quantifiable measures in elite sport is to the expense of other kinds of values associated with sport. Consequently, the discourse of genes, leads to an essentialist view of sporting performance, which marginalises other factors that contribute to an athlete's performance capacity.

LIFE HARMS

One of the broader claims against GM is the harm it inflicts upon the value of life. From such a view, the idea of 'playing God' reflects a deep-seated concern for the way in which life is treated by unnecessary technology. Thus, it is claimed that, to genetically modify life is to render it as a means to an end, to treat life as an artefact (or technology) rather than something that has inherent value. Thus, by altering a potential life for reasons other than health, one is objectifying it by imposing a template of how that life should be. As Harris (1998, p.244) explains,

> ...if genetic connections are established for things like musical ability, athleticism, and intelligence, there will be immense pressure to specialise in the education of children earmarked for success or failure in such areas.

This has been raised recently in relation to cloning. The alarming possibility that parents might wish to clone themselves or others so that they can have a particular kind of child has been condemned for it being fanciful and exploitative. The idea that one can engineer people at all, thus raises concerns for the motivations of parents and how a child might be treated by such parents once it is born. In the case of pre-selection, this is

particularly alarming, though also has relevance for other kinds of GM. Again, comparable to sex selection, it is the motivations of the engineer (or parent) that are ethically alarming as opposed to the technology itself.

In response to such harms, it has been argued that the pre-embryonic threshold might serve as some guide to acceptable engineering. Thus, if the life is pre-embryonic, then it cannot be harmed in the sense that one might understand a life to be harmed if it is altered after this 14 day period. Supposing that this 'primitive streak' (Warnock, 1987) stage is accurate and, providing that modifications take place before this time, then the life is not harmed. However, there does exist some basis for ascribing minimal rights to such lives to recognise that they are not just expendable.

As well, the rejection of such technologies on account of them embodying some anti-Kantian maxim upon the treatment of life does not seem warranted. It does not follow that any parent that choosing to engineer their child will treat that life as means to an end. As Harris (1999, p.70) argues,

> There is no evidence for...the supposition that if people choose to use a cloned genome in order to create *their own children*, that these children will not be loved for themselves, let alone not treated in a civilized way.

An additional concern from the life harms is of a more practical nature. It has been argued that GM is far too experimental and wasteful of life to be ethically sound. In response, it can be argued that all advances in medicine and technology require some degree of experimentation and that it is simply a case for finding at what point a technology is deemed to be overly experimental. As Macer (1990, html) says,

> The answer to the question how much experimentation is ethical, could be none, or some depending on the age and the experiment in question, or it could be any up to a certain age. One moral assumption that can be made is that it is completely unacceptable to make use of a child or an adult as the subject of a research procedure which may cause harm or death ....The argument whether an early embryo is of the same status as a fully developed fetus is a slippery slope argument.

From this harm, however, emerges a concern for the sanctity of life and its protection from exploitation through commercialisation. In the last two years, this has been of great concern due to the emergence of companies that wish to buy and sell human eggs and sperm (Miah, 2002). Such companies appear to be gaining a stronghold for prospective parents who might wish to buy their way into parenting – in a comparable manner to the way in which one purchases private health care (Resnik, 2001).

SUMMARY TO 'NEW' HARMS

This overview of new harms cannot be exhaustive of the various harms that arise in relation to GM in general. Rather, it speaks to the specific genetic technologies that are most likely to be relevant to the application of genetics to sport. Collectively, they provide a substantial level of argumentation for concluding that the application of genetics to sport is ethically suspect. Nevertheless, before deriving such conclusions, it is important to recognise that they provide only one component of the ethically relevant consequences of genetics in sport. Thus, it is first necessary to conclude this analysis of the ethical issues arising from the various technological effects in sport.

DE-SKILLING AND RE-SKILLING: Does GM de-skill or re-skill sport?

The implications of de-skilling and re-skilling effects do not seem to raise any ethical issues in respect of GM. In none of the possible applications is there a consequence for the skills required to perform in sport (GM does not provide athletic skills). However, this conclusion depends somewhat upon how skill is defined. If the capability for endurance is defined as a skill for long distance runners, and GM can promote resistance to fatigue, then GM does de-skill the activity. Simplistically, the technology will make the attainment of excellence a more easily attainable goal for athletes.

Perhaps to illustrate how this is evidence of the utility of the conceptual framework, it is possible, for example, that de-skilling and re-skilling does have implications for a different kind of technology. Thus, a U-grove golf club (Gardner, 1989) or polara golf ball (Gelberg, 1996) do alter the kinds of skills that are necessary to be good at sport.

Indeed, for each of these cases, they can be said to de-skill the activity, making it easier. As such, they do raise ethical issues in relation to this construct of technology, since making a skill easier does affect the value of the sport. However, it is not the case that the athlete, by simply being genetically modified, will have an elite level of skill capability. Rather, they will still be required to complete the necessary training to become a competent athlete. Consequently, in no way does GM alter the kinds of skills that an athlete needs, nor does it diminish the level of skills that is required. Thus, it does not seem that GM *de-skills* or *re-skills* sports.

DEHUMANISING AND SUPERHUMANISING: How does GM challenge being human?

To assist in concluding whether GM in sport alters a notion of humanness it is useful to draw upon perspectives in sports ethics and bioethics. The initial difficulty with establishing whether any technology affects such a construct (and thus, whether it might be considered unethical for this reason), rests with the business of defining the human. Within sports ethics, this has entailed seeking to identify what is the human performer, as a basis for arguing why specific performance enhancements are unethical. In bioethics, the same issue has been raised in the context of considering what kinds of intervention on the human condition are consistent with a prescribed view about the authority of humans to alter their bodies and minds. Such discussions have been of particular relevance for issues such as abortion, euthanasia, and the use of genetics, which centre upon an articulation of the value of life.

The argument from humanness implies that there is a recognisable entity called 'the human' that can be argued as the valued aspect of a sporting performance. As well, it prioritises the 'human' role in performance over any other (such as, the technology). If it is the case that technology seems to remove the human (dehumanise) or augment it in some way that ought to be of concern (superhumanise), then it is paramount that a perspective about the acceptability of such technology is given.

In the case of sport, identifying how and whether the human has been dehumanised or superhumanised is the critical factor in the discussion about humanness, as it depends upon identifying what is meant by the term 'human'. Attempts at, what would seem to be, a relatively essentialist answer have been made outside of sport in a number of ways. Similarly, in the case of GM, to conclude that the human has been de-humanised or *made less human*, seems to require an assertion about what counts as being an athlete. It requires being able to assert that it is humanness that give sports performance value. Finally, the bolder statement must be made that, without the human, sport would have less value.

On finding some tentative conclusions to these questions, the latter point can be raised to argue whether GM does tend to dehumanise or superhumanise the athlete. In the case of de-humanisation, it argues that reducing the role of the human (de-humanise) by making the attainment of achievements in sport more easily accessible, unacceptably, de-value the practice. For example, employing the use of depth-finders in fishing to allow the angler to detect the best places to cast, removes the skill of locating a place to fish based upon an acquired knowledge. Equally, to use something like the polara asymmetric golf ball to reduce the hook on one's swing, would be to provide a skill that is not acquired through practice and thus, which unacceptably reduces the challenge of the activity by using technology. From these descriptions, it can be seen how affecting humanness can be considered conceptually similar to affecting the skills within the sport. However, in respect of humanness, the technology need not reduce the role of *skill* in the performance, but the role of the *human* in the performance. For dehumanising to occur, the technology must *replace* the human in some manner, not simply make it easier to perform. Conversely, to super-humanise the athlete by enhancing the capabilities for performance is regarded as unacceptable since it provides the athlete with capabilities that are not warranted and that do not provide a reflective account of the athlete's own abilities.

Schneider and Butcher (2000) and Loland (2000) recognise that defining the human has a bearing upon what kinds of technologies are acceptable for use in sport, since value in sport is inextricable from being human. This perspective is articulated in respect of drug

taking and the use of other kinds of technologies, and is premised upon wanting a sports performance to be reflective of 'human' capabilities rather than 'technological' ones. However, within sports ethics the position has not really been tackled for it being a particularly difficult matter to resolve. As Schneider and Butcher (1998, p.196) recognise, there is not "an agreed-upon conception of what it is to be human" and so, from their perspective, it is not possible to appeal to such a concept. Yet, some attempts must be made to elaborate on this important concept, which seems so frequently a basis for drawing conclusions about the acceptability of technologies in sport. Attempts at any such definition are replete with contradictions, though have endeavoured to isolate humanness by contrasting it with other kinds of entity, such as animals, machines, and automata.

ISOLATING THE HUMAN CONDITION

An early theme within philosophy that reflects the attempt to distinguish humans from other entities is in the context of non-human animals. The works of Michel de Montaigne (1533-92) argue that beasts are more natural than humans and, moreover, that there is a greater difference between humans and humans than between humans and animals. Ideally, Montaigne argues, humans should aspire to be more like animals rather than to mark themselves of as being distinct and superior to non-human animals.

Subsequently, the work of Rene Déscartes (1596-1650) marks a significant development in philosophical approaches to understanding the human being. Déscartes rephrases the question in the context of animal intelligence, placing at the fore the discussion about an animal's ability to reason, rather than its possession of a soul. By identifying the perfection of animal actions, Déscartes concludes that animals, unlike humans, do not have free will and the ability to determine actions. Whereas animals are perfect, humans have the ability to chose imperfection and make mistakes, represented by the story of the Garden of Eden. Additionally, humans must strive for perfection through reason and, from here, Déscartes concludes that the method through which humans reason is rational doubt and arrives at his canonical approach to philosophy, rational deductivism, and its resultant legacy, '*cogito ergo sum*', I am thinking, therefore I exist.

Distinguishing humans from animals, is not the only way in which philosophers attempt to reveal a coherent articulation of the human. Far from being a progression from the human-animal distinction, ideas seek to distinguish between humans and non-living entities or automata. Arguably more distinct and enduring than the literary articulation of the distinction between animals and humans; mythical and fantastical ideas about human/machine hybrids are present from stories of Icarus and his wings, to Chinese, Greek, and Arabic text that are rich in the subject of automata (Mazlish, 1993). The mixing of fact and fiction is an important factor in these discussions, which plays an important role within the ethical consideration of new technologies. The ability to conceptualise the abstract being, the automata, the cyborg, or the genetically engineered human, are all useful ways to approach a clearer understanding of what constitutes the human and what might constitute a desirable circumstance for the future of the human being.

More distinct than ideas about humans and animals are the fears attached to automata and the insecurities that are evident through conceptualising the living machine. The automaton has been represented as posing an irrational threat to human beings, calling into question their identity and powers of domination. Literary examples abound, including Hans Christian Anderson's Fairytale story, *The Nightingale*; Mary Shelley's *Frankenstein*; and more recently, Isaac Asimov's robot stories.

Within each of these examples, there is a degree to which the new being creates a problem for the humans around it. Anderson's *Nightingale* tells the story of a mechanical nightingale that charms a Chinese Emperor far more than the real nightingale that had been with the Emperor for many years. Its greater beauty and more pleasant song, results in the real nightingale being banished and fleeing from the Emperor's side. However, a year later, the artificial bird breaks down and cannot be repaired. The Emperor begins to die and, hearing of the news, the bird returns and the Emperor returns to good health once again. The story symbolises that it is biological life that endures and not machinic life. The difference between humans and automata is simply that the former represents life, and the latter death.

Other texts hold a similar message, most notably with Shelley's *Frankenstein*, the monster is a human creation that is comprised of part biological and part mechanical methods. The resulting being is grotesque and alien to the human world, within which it soon becomes monstrous and violent. Interestingly, the monster of Frankenstein becomes terrible only when it is rejected from human society and so the inherent monstrosity of the being is unclear. It is not that the monster is terrible in itself, but only because other humans do not embrace it. On this point, Mazlish (1993, p.44) identifies that the story provokes the following warning about the future of the human species

> ...if humans insist on their separateness and superiority in regard to machines (as well as other animals), viewing them as a threatening new "species" rather than as a part of their own creation, will they, indeed, bring about the very state of alienation that they fear.

These and many other stories that write about automata, cyborgs, or robots, are conceived by humans as originating either at the hands of gods, or by humans using magic or science. They all pose the same compulsive question: how do automata differ from humans, or more simply, what is human?

In its most recent incarnation, the classical period of Enlightenment marks the triumph of humanism over theology and many of the scientific discoveries of previous years are reworked and understood by scientists of this time. However, defining the human did not end during these times and new technologies provide the means for further kinds of discussions about the human being.

The Machinic age provoked a significant development in writing about the relationship of humans and other entities. The discourse reflects a scientific concern with automata and the Romantic revulsion against the mechanical Newtonian worldview. It illustrates the range of curiosities, embodied in scientific inquiry and legendary stories, concerning the creation of life from inanimate material during this period of re-constructing the value of technology. Intuitively, one might not conceive of machines as entirely

different from automatons, though the period and the writings within it deserve a separate categorisation.

The subsequent years would see the works of some profound philosophers and scientists, with a far more sophisticated sense of science than had existed before. This period of 'isms' (Transcendentalism, Idealism, Existentialism, Nihilism, Realism, Pragmatism, Socialism, Communism, Liberalism) included such great icons of western history as Charles Darwin, Karl Marx, and Schopenhauer. The presence of machines in daily life made the distinction between humans and non-living entities more acute, particularly during the late 19th century and early 20th Century, where machines would be far more confrontational to a worker's life than ever before and increasingly within the family home.

The machine became an object of human interests, a means to an end, accentuating the role of the human being as a tool user. Tools were used to extend personal power and freedom, at the same time as subjecting individuals to its impersonal organisation (Mazlish, 1993). Tools became the mediator for humans and the environment; an artificial skin separating humans from other animals.[28] The division of labour transformed the human into a mere body part – a hand – and reduced a worker's relationship with each other to functional, economic value. From here, it was a small step – conceptually – to the computer revolution. The computer reflects the pinnacle of machinic automation, extending human faculties as well as replacing humans and making humans more machinic, physically and cognitively.

Darwin's biological humanism allows the human to be reduced to a level of mechanics and, arguably, this view pervades contemporary understandings about humans. The classification of species, and the *survival of the fittest* hypothesis reduces the complexity of life to relatively simple relationships. However, it is here where the barriers between animals and humans collapse, identifying the difference between them as being one of degree, rather than of kind. Indeed, in Darwin's view, the most fundamental difference between humans and animals is that humans possess a developed sense of morality, or conscience, and religion. From here, the debate about whether humans are comprised

mainly by genetic, inherited qualities, or whether humans are more socially determined - the nature versus nurture debate - begins to ensue. This dialogue becomes increasingly pertinent with the emergence of psychology and the work of Freud and Pavlov.

Moving from modern to post-modern articulations of the human condition also plays an important role in understanding how humanness as it is articulated in present day ethics. Such authors as Aldous Huxley in his classic text *Brave New World* or George Orwell's *1984* (1940/83), are continually present within discussions about the biogenetic revolution and their ideas (or prophecies) continue to haunt humanity and its scepticism about the genetic revolution. This period of redefining the human condition as distinct from other entities is not limited to any specific technology. It encompasses biotechnologies, but also includes such innovations as artificial intelligence and virtual reality. Nevertheless, the symbiosis of the organic and machinic takes place in its most extreme form through the merging of humans with medical technology, allowing the transplantation of limbs, and the re-constructing of life, which utilises technology and biology.[29]

The works of Alan Turing (1950) and John Searle (1980) attempt to distinguish the human mind from a computer programme and the dialogue of whether human minds are entirely machinic in their functioning, has its roots in Déscartes. However, unlike Déscartes, scientists of this time show that the mind is not a reliable measure of existence. This is most evident from Damasio (1994/6), who argues that *Déscartes' Error* was in supposing that cognition and an awareness of thought are the real substrates of being. In contrast, and through the utilisation of medical cases that speak contrary to Déscartes, Damasio argues that the mind and brain cannot be separated. Rather, beings begin only as beings; they then gain consciousness, a simple mind, then the possibility of thought, followed by the possibility of using language to communicate, and finally the capability to organise thoughts in order to think more coherently. Thus, contra Déscartes, Damasio concludes that being precedes thought.

It would seem that any conclusion to the question 'what is human?' does not demand an answer for it to be a meaningful question to ask. It might be possible to conclude which characteristics are defining of a particular species, such as language, rationality, self-awareness, a sense of morality, the capacity to reason, culture, the recording of history, or the creation of machines. However, identifying characteristics is not a particularly defensible basis for building ethical conclusions about technology. Indeed, this is most evident from contrasting this analytical history of defining humanness with a moral inquiry into the same questions.

WHAT WE ARE AND WHAT WE DO.

Subsequent to the unsatisfactory definitional approach to characterising humanness, philosophers argue for a more pragmatic method to its definition. As Mackie (1977, p.20) recognises, "It would be a mistake to concentrate second order ethical discussions on questions of meaning". Thus, the human is categorised, not by what it *is*, but by what it *does*. The work of the Protestant theologian Joseph Fletcher is most relevant here, in stating that a human entity is something with "self-awareness, self-control, a sense of the future, a sense of the past, the capacity to relate to others, concern for others, communication, and curiosity" (cited in Singer, 1993, p.72).

In respect of sport, this way of viewing the human recognises the dynamic and insufficient approach of biological definitions. On such bases, contemporary elite athletes can be argued as already being superhuman, or beyond traditional notions of humanness – they are the present-day cyborgs. The expectation upon athletes to perform increasingly spectacular performances made explicit by the emphasis upon results and world records is some indication of this. Moreover, it could be argued that this expectation predisposes the athlete to change, where change is to be construed as a linear progression towards greater physicality and achievement capabilities. However, as questionable as the way in which sporting bodies have been already augmented is, the technology that is under development will be far more profound in challenging notions of humanness.

As such, seeking a biological definition to the question of humanness is not the most useful way to allow any meaningful dialogue about the degree to which technology should augment the human. In contrast, the richness of ideas about human *identity*, which derive from the moral philosophical approach of understanding humanness allows a more informed awareness about which aspects of humanness are worthy of protecting. The scepticism for being able to isolate 'humanness' is reinforced by post-modern critiques of being human, which reject any attempt on conceptualising the human condition as bunk (Hayles, 1999). Accepting such a critique, any attempt to premise ethical conclusions upon an alleged notion of humanness is desperately misconceived and leads to concluding that elite sport tends more to argue that *anything* can be human.

Retracting from the biologically-based articulation of what is human, sports ethics has begun to utilise the concept of 'persons' rather than humans, which serves as a useful starting point. Conceptually, the links of this perspective can be traced to the work of Emmanuel Kant and it fits with the Darwinian ideas about humans being distinct for their characteristic of morality. The claim is premised upon identifying that sport is a measure of *persons*. This move from humanness to personhood also responds to Schneider and Butcher's (2000) conclusion that there is no such accepted articulation of what is being human. To the contrary, such a discourse exists within both sports ethics and bioethics, premised upon personhood. Indeed, Kantian ideas have informed a substantial amount of work in sports ethics in regard to understanding what can be considered as a desirable moral character in sport, and are useful in this approach. As well, DeLattre (1975) and Bailey (1975) develop an appreciation of personhood and agency, which would inform later debates departing from a notion of agency as determining ethical conclusions about performance enhancing technologies. It is important to note the distinction between this use of Kantian ideas and the previously referenced 'respect for persons' rules that were identified in the 'old' harms of GM within the 'Safety and Harms' section. In contrast to this classical articulation of Kantian ethics, the present discourse isolates respect for *personhood* as following a similar approach, but to different ends.

Thus, the conclusions tends more to align themselves with Tuxhill and Wigmore (1998), who seek elaboration upon what are the aspects of personhood that give it value. Their approach is distinct from others in sports ethics, which have been restricted to addressing respect as an attitude to be held between persons. Previously, Simon (1984) argues that the notion of personhood is best thought of by recognising the sporting attitude as a mutual quest for excellence through challenge. This notion of a quest implies a level of agency that considers it insufficient that only bodies matter – it is necessary that there is a mind and character that struggles to bring about the performance. This perspective is used to argue that drugs reduce the sense of humanness by making the body solely responsible for the performance, as opposed to being the consequence of the athlete's resolve. Despite some weaknesses, the position has attracted a number of ethicists seeking to cite the morality of athletes within a MacIntyrean notion of practices.

However, such respect has not been extended to the abstract human or humanity in general. In contrast, Tuxhill and Wigmore (1998) problematise the concept of a person and lean more towards understanding what the notion of respect entails from a perspective of understanding personhood rather than simply applying Kantian principles to the ethical issue in sport. From this view, to hold respect for personhood is considered as having respect. However, this notion of respect is not directed towards specific individuals (although individuals are implied by the claims). Rather, it is to have respect for the species called 'human' in spite of its fuzzy boundaries. This notion of personhood might serve to identify what is important about an athlete's performance that is under threat by GM, and assist in deriving ethical conclusions.

A similar approach can be found in bioethics and the importance of broadening the literature that informs this discussion is paramount to a satisfactory articulation of humanness (Brown; 1990, p.71; Burke. 1997, p.100). Macer (*ibid*) raises the matter in the context of two central kinds of question:

> There are two basic approaches that have been used in discussing questions of life and death. One centres on whether it is ever morally permissible to take the life of

> any human person; and draws parallels between abortion, warfare, self-defense and capital punishment. The other centres on asking the question of what constitutes a human person, and ranges over the issues of brain death and permanently comatose patients, abortion and the quality of life.

Macer argues that the question can be emotive, but that it requires a rational approach to understanding "whether we view ourselves as a member of the human species, or as a person". Personhood is a much safer term than humanness, since the latter raises difficulties of biological comparison with other species. Macer continues, saying that, "a person is generally referred to as someone who is rational, capable of free choices, and is a coherent, continuing and autonomous centre of sensations, experiences, emotions, volitions, and actions". From here, he identifies two traditions, one deriving from an Anglo-Saxon reductionist philosophy that considers the person as acting "in certain characteristic and identifiable ways" and a Greek idea, present in Christian speculation and language about the human soul. Thus, the human in possession of a soul is a person. Macer identifies a number of characteristics of personhood:

1. Capability for change
2. Social interactions
3. Self-awareness of personal identity
4. Spirituality (or some special status).

Similar ideas can be found in sports ethics, where Tuxhill and Wigmore (1998) utilise Kantian notions of 'rational will' and 'self-determination' as delimiting personhood. This perspective extends to ideas of 'human dignity' which are often used as a means to justify moral conclusions in respect of genetic technologies.

In relation to the genetics issue, the questions about when one can conclude personhood to exist and thus to conclude when and how it might change, have been developed within a number of applied issues. In particular, the discussion of abortion has raised perspectives that seek to conclude when a human life becomes morally relevant – when it can be considered as deserving treatment of respect. From one perspective, this point in time is considered to be conception, particularly from views

with specific religious origins, such as the Roman Catholic tradition. Nevertheless, from other views, such as Islamic religion, becoming human is a process that takes place over time during gestation (Macer, 1990). Modern, western medicine tends more to follow the latter of these views, as has been explained in the 'Life Harms' of the 'new' harms of GM. Nevertheless, the foundations for this conclusion are, importantly, not religious. The primitive streak period is enough for bioethicists to conclude that, "the biological qualities of personhood are not present at conception" (*ibid*). Importantly, what is being articulated here is not a vision of when life begins, previously rejected in this section as being a biological approach to defining humanness. Rather, this argument is premised upon when a life becomes morally relevant or, in other words, when it attains characteristics of personhood. Thus, the pre-embryonic life is what can be called a potential person,

> There are sufficient doubts over the commencement of human personhood until the cerebral cortex begins to function, not to consider the embryo a person until at least 8 weeks and possibly up to 24 weeks. We await further scientific knowledge. Before this period, the status is lower than a human person, and should be recognised as such in law. After this period, the next clear mark is viability, and during this period the fetus takes on the status of an individual human being. Our scientific data does not allow any finer demarcation than this. As previously stated, a society may put earlier limits to protect the human embryo or fetus because of social or religious reasons, but they will not do so because of scientific reasons. (Macer, *ibid*).

However, the notion of personhood is also not straightforward to isolate. The characteristics offered by Macer provide a starting point, though they are also challenged by various kinds of life that would be considered as human, though which might not fulfil the requirements of personhood. In particular, the characteristics have been critiqued in respect of comatose patients, or patients with substantial mental disorders, who do not seem to exhibit the characteristics of personhood that are being argued as requisite of humanness. From such a view, it would be necessary to conclude that such lives are not human, which does not sit well for some ethicists. Indeed, Tooley's (1986) controversial paper about abortion and infanticide is some indication of how philosophical premises about personhood lead to counter-intuitive conclusions about the value of some lives and how they should be treated. Here, Tooley (1986, p.64)

argues that a right to life is determined by having a *serious* claim to life, where the life "possesses the concept of a self as a continuous subject of experiences and other mental states, and believes that it is itself such a continuing entity". In this respect, Tooley concludes that, neither foetuses, nor infants have any such claim, despite the prima facie obligations that such lives would seem to demand. Interestingly, Tooley also concludes that, on this basis, it is possible for some animals to have a serious right to life.

Equally, in sporting literature, Brown (1995) considers that the notion of persons is problematic on a number of levels. Initially, it omits to consider animal sports, such as horse racing, cock fights, or bear baiting. (Admittedly, one might challenge whether these are sports at all, though Brown's point does seem important to note.) As well, Brown recognises that the notion of personhood does not distinguish what it is about being a person that makes it necessary for sports to have value. In some respects, the distinction is not useful in as much as one can argue that a technology that alters persons in some biological sense, can also be said of food and training.

Additionally, this approach to humanness does not sit well with ideas that seek to locate a rejection of new technology in a discourse about what humans *are* biologically. The arguments of naturalness and normality identify such a view, and wish to conclude that a technology might not be acceptable on account of it changing the biological constitution of an athlete in some immoral manner. From the present perspective, it is considered that such a basis cannot be given. If GM allows an athlete to run 100m in five seconds, then the rejection of this technology cannot be based on biological humanism. Admittedly, such a human would not fit within what is commonly recognised as human limits, though this seems simply a case of boundary-drawing. After all, the breaking of world records in sports *at all,* does not fit within what is known as humanly possible either.

In respect of the genetically modified human in sport, the discussion must be phrased rather differently. Despite some seeming contradictions about the utility of personhood as a measure of humanness, it provides the best available theoretical perspective about such a definition. Thus, using characteristics of personhood, it must be asked whether

the genetically modified athlete can be said to be any less of a person (or any more of one), by virtue of them being modified.

Perhaps the only case of genetic technologies where this might not have any relevance is for the pre-selection of individuals, where embryos or young children are chosen or rejected for elite training on the basis of their genotype. Nevertheless, one might still question whether the use of such technology fits with a moral view of humanness, given its implied objectification of human life. Although the affected human might not be any less human by using such technology (it is not altered at all), the tolerance of such eugenic technologies might seem somewhat immoral and uncharacteristic of humanity therefore. Yet, a rejection of this technology on account of it altering the affected human does not seem justifiable as they are not altered in any way.

In respect of somatic-cell GM and genomics, the use of such technology does imply an alteration of personhood – at least in respect of the morality of the character choosing to use the enhancements. On Macer's definition, it does not seem that the individual is altered as a person, or is any less or more human. Yet, Shapiro (1991) considers that performance enhancement in sport alters a sense of identity that is morally problematic because it is not possible to know who has made the performance possible – the technology or the athlete. Genetic modification challenges this because it provides human capabilities that did not previously exist. Thus, on account of these applications having been the choice of the athlete to use them, it can be argued that they do threaten a sense of what it means to be human, by bringing into question what separates humanness or personhood from technology. On such a basis, they would seem ethically problematic.

In the case of germ-line GM, the issue is rather more difficult to conclude. There cannot be any reflection on the notion of personhood for the altered individual, since no choice has been made by the person to engineer themselves. Indeed, if an enhanced embryo matures to become an elite athlete, posing the question of whether they are any less human is non-sensical. It is akin to asking somebody who has a naturally enhanced genotype, whether they feel any less human than somebody with a more 'average'

genotype. As such, the basis of humanness as a means to reject germ-line GM does not seem justified. Such claims made about personhood, respect, and agency, have lead sports ethics and bioethics into virtue theory as an ethical framework for deriving moral conclusions. Yet, in respect of GM, it is also problematic to argue that the technology is detrimental from this perspective. It does not seem possible to claim that an individual who has been genetically enhanced before birth is unable to be a virtuous athlete (whatever that might mean). Neither does it seem feasible to claim that the individual could not experience internal goods of competition simply because they are engineered. One might simply draw a parallel between athletes with a particularly capable genotype (that has not been enhanced) and ask a similar question. It could not be claimed that having an enhanced capability for athletic performance precludes the appreciation of the internal goods of a sport. Again, this relates somewhat to the condition that the genetic advantage is not chosen by the individual and thus, cannot be seen as an act that reflects a particular attitude (treating people as ends, or valuing competition for external goods).

CAN SPECIES' BE PERSONS?

Applying the question to the broader perspective of humanness outlined by Tuxhill and Wigmore (2000), it must be asked whether GM is problematic from the perspective of the human species. This perspective asks whether respect must be held for the characteristics derived from a notion of personhood, and for the abstract entity of humanness that embodies these characteristics. This matter is not dissimilar to the previous question about whether harm can be committed to non-life forms, such as sports. In this case, it is under question whether an ethical argument can be formed on the basis of concern for dehumanising an entire species. For this reason, questioning the humanness of specific individuals is considered less important than the broader question about how humanity is changed as a consequence of using such technology. From the biomedical perspective, Anderson (1994) elaborates on this condition, asking whether genetic engineering might change the human species in some morally

significant way. Underpinning this discourse is an assumption that, if it does change humanness, then it ought not to be done because it will render the species no longer human. Again, this position seems to restate the unnaturalness argument, which has been previously refuted.

Within the philosophy of sport, Paul Weiss (1973) provides some form of response, by recognising that athletic records are objective summaries of what people have done. They serve as indications of human capacities and as a medium of comparison among people of different times and places. On Weiss' view, records are measures of the human condition, though also offer a normative representation of the human species. In many respects, this concern is appealing and fits with the intuitive view that some kinds of technology might not be good to employ for the survivability of the human species. From such a perspective, the previously noted concerns about 'genetic diversity' are also relevant.

INCREASING PARTICIPATION: Does GM increase participation?

The final 'category of effect' to discuss in order to complete the overview of how GM raises ethical issues in sport, is the category of participation. As was identified in the conceptual framework, a technology can raise moral issues in respect of it altering the level of participation in sport. It is important to recognise that the justification of 'increasing participation' or the rejection of a technology that 'reduces participation' are not, in themselves, particularly important in a discussion about elite sport. Indeed, it does not seem plausible to conclude that elite sport can aspire to inclusivity in any way. Consequently, to base arguments about technologies on account of them increasing participation does not merit much strength.

Nevertheless, GM might be a case that does give rise to reasons for further concern about inclusion, even within elite sport. Put simply, to allow GM would be to make sport, necessarily, a genetically modified pursuit. If modified athletes were allowed to compete, then athletes who are not enhanced would, probably, be excluded, since they would not be of sufficient excellence to be elite. They simply would not be attaining sufficiently good results. This would seem quite unsettling, since it implies the absence

of many current athletes to whom spectators and fans have a strong emotional affiliation. Recalling the assumptions made at the outset of this analysis of GM in sport, genetically modified athletes would exist alongside the non-engineered. As such, the latter would find themselves unable to remain competitive in elite sport and would thus, be disadvantaged. Again, we might concur to genetic essentialism and argue that the likelihood of this happening is remote. Yet, occasions could arise where persons might be justified to make such claims. However, it is less persuasive when one realises that similar kinds of exclusion are present already in elite sport. After all, genetic differences already exist. Indeed, recognising that elite sport is premised upon selecting the best and eliminating the others, it seems farcical to conclude GM is unacceptable on account of it having a similar effect.

It is speculative to conclude precisely how GM would affect participation. Conceivably, if genetically modified athletes were allowed to compete, it would reduce the attraction of sport for those athletes who were not modified. Though importantly, whether this would affect participation in general seems very much to depend upon the availability of the technology. Certainly, such modifications would be very expensive at the outset. However, this is still not a sufficient basis upon which to reject the technology. Currently in sport, there exist financial inequalities that lead to the unfair advantage of some over others.

From the spectator's perspective, it is also speculative to consider whether an interest in sport will wane from performances being genetically modified. It might be argued that sport will become less interesting if athletic performances are not determined by the athlete. Alternatively, elite sport seems interesting to watch specifically for the spectacular performance that it displays. If an athlete were sprinting 100m in 5 seconds, this would still attract spectators' attention.

Certainly, there exist ethical concerns about participation in relation to GM. However, rejecting such technology on account of it reducing participation does not seem sufficient in this case. At most, it points to a fundamental inconsistency within elite sport between striving for egalitarian principles of fairness, and being inherently

exclusive. Certainly, genetically modified athletes might make it more difficult for the non-modified athlete to succeed. However, that can already be said as true, since genetic differences currently exist between athletes.

5. Conclusions: Balancing Harms and Elaborating on Humanness

At this stage, it is important to make the connections between the ethical analysis of GM in sport and the broader conceptualisation of technology in sport more explicit. Initially, it was argued that there is no coherent conceptual framework within which to understand how technologies alter sport. Moreover, the ways in which technologies alter the ethical status of sporting performance is, comparably, untheorised. As such, a framework of technological effects was derived, based upon the available literature in sport that has spoken to these matters. From this, emerged clear categories of effect which, while not claimed as exhaustive, provided a representation of the ways in which technology alters sports. Subsequently, 3 brief case studies were used to identify how these effects give rise to ethical issues, from which it was concluded that an over-riding approach to understanding the ethical implications of technology in sport is not possible. Rather, it is necessary to locate a discussion about the ethical implications of new technologies in detailed case studies. Importantly, it was also recognised that this need not prevent inferring broad normative rules about the ethical use of technology in sport. Instead, it is simply to claim – in accordance with the casuistic approach to ethics – that the significant ethical issues are found in detailed cases, rather than overarching analyses.

Subsequently, a detailed analysis of GM in sport was given, framed by the conceptual framework about technologies. It has been argued that the more substantive ethical concerns arise from their propensity to alter levels of *non-injurious harm* and of *humanness*. For each of these effects, the ethical conclusions hinge upon some prescriptive premise about what constitutes value in sporting performances. As such, these conclusions will be directed towards these 3 elements: the sustaining of *sporting excellence* through discussions of *harm* and *humanness*. Importantly then, the ethical investigation has – in the case of GM – led to dismissing the importance of other technological effects that appeared in the conceptual framework. In the case of other technologies, it might have been necessary to focus on other technological effects. It is also important to recognise

that the categories of interest in respect of GM derive from the conceptualisation of technologies. Without such a conceptualisation, the ethical analysis would – like many other analyses before it – be part of an unstructured theorising about technology and performance enhancement in sport in general. It is critical that discussions about technology can be cited within a theory about performance enhancement, so it is necessary to restate these links.

On the basis of these deliberations, there are three central ethical concerns: one about sport, another about harm, and a third about being human. Consequently, the structure of the conclusions will speak to these strong themes in relation to the ethical status of GM.

5.1 On Sporting Excellence and GM

Following Kretchmar (1992) and Schneider and Butcher (1994), it has been argued that sporting excellence is not defined sufficiently by considering solely performance-related characteristics. Nevertheless, there remains a tension within the philosophy of sport to establish whether competition is valuable for it being a test of physicality, character or some combination of both. This tension is heightened and clarified by the case of GM, which reveals a weakness in the assertion of physical performance as being the aim of elite competition. If the test of character is given greater importance, then the value of genetics is lessened and the utility of GM seems reduced. Yet, in some important respect, sport is also about quantifiable performance and striving to improve upon physical, quantifiable, measurable, achievements.[30] In particular, the value of improving performances is of central importance to elite sports for which GM is most likely to be relevant. For Munthe (2000), GM can provide more physically competent athletes and this appears to be his benchmark for excellence in sport or, at least, his justifications for rejecting possible arguments against genetic enhancement depart from this basis.

However, such characteristics are surely too narrow and do not question what kind of enhancement is reflective of sporting ideals. Munthe seems aware of this when he outlines his argument about athletic tradition and notions of fair play. Indeed, it is also

within elite sports that there is the greatest expectation of fair play, even if it does not always seem to transpire. There is an aspiration for elite athletes to be good in character as well as in performance. It is the mediation of performance enhancement with character excellence that can be said as capturing what is valued in sport.

On this view, it does not seem that GM necessarily devalues these qualities. Moreover, the negativity surrounding the use of GM as a method of performance enhancement is contingent upon it being rejected from sport. If it is banned, then GM becomes a form of cheating and unethical. However, until such a time, an evaluation of its worth remains open and, on the basis of the ethical discussions herein, it would be inaccurate to conclude that GM cannot add to the value of sport. One of the more significant challenges to the way in which the issue of genetics in sport is addressed is to observe whether the approach from governing bodies is one of openness to considering whether it can be an ethical means of performance modification. The discussions here suggest that there are substantial reasons for recognising the importance of such a perspective. The utility of biotechnologies in society is evident from the various applications it has for benefiting health and improving standards of life in general. Consequently, to dismiss genetics from sport would be to reject the ways in which it could improve sport. For example, if genetics can create an athlete that is less likely to sustain injury in sport, then this would seem advantageous (from a sporting perspective). Indeed, such an application would seem similar to using various kinds of padded clothing to prevent serious injuries, which do not seem unethical. Nevertheless, within such discussions of any given sport must be an analysis of what is the role (and thus, acceptable level) of risk.

Additionally, it must be recognised that performance enhancement is not necessarily an ideal to strive towards with any method. Rather, it is the way in which the enhancement is achieved that gives value to sport. More importantly, it is necessary to understand the specific kind of enhancement under discussion in order to conclude its value. Such an inquiry requires understanding what are the characteristics of sports that give it value, even if the task is, as Munthe suggests, difficult.

As a tentative conclusion, it would seem that sports are interesting because they constitute the performances of human beings; individuals engaged in practices that are challenging and which competency reflects years of training and commitment. As well, sports performances are enterprises which comprise an extraordinary integration of skill and talent, which is devalued if athletes can be given such abilities (which seems possible at least, in the case of talent) by performance enhancing technologies such as GM. With this in mind, it is possible to address the second component of the ethical concerns – the way in which GM gives rise to harms.

5.2 On Harms and GM

The arguments concerning possible harms related to GM in sport suggest that the 'new harms of GM in sport' are the most persuasive concerns. The harms raised about GM from sporting values – the 'old harms' – seem mostly contingent upon the negative evaluation of GM, which is the very question that is being asked. At this stage, it is not clear that GM is morally problematic and so it cannot be dismissed as an unethical method of performance enhancement. The risk of injury is not sufficiently substantial in the case of GM. However, this does not rule out the possibility for abuses of the technology – for which there is a stronger case of making such applications unethical. Nevertheless, where the technology is deemed sufficiently safe – at least by medical standards – then it is not possible to raise harms on the basis of harms to health. Quite the contrary; the technology would be desirable because it promotes health.

As well, contract harms, rules harms, and fairness harms in relation to non-using athletes are contingent upon the technology being ruled illegal, which is still a secondary ethical issue. Harms deriving from negative role models or expectation disappointment derive from the initial moral evaluation of the technology. The concerns about coercion seem to be of no greater or no worse consequence – from the sporting perspective – than do similar concerns in relation to other aspects of becoming an elite athlete. However, it might be necessary to question whether the coercive tendencies of elite sport are, at all, morally justifiable. The harms to society lack persuasiveness except for where the applications seem contrary to a tacit, but strong sense of public rejection. In such

circumstances, this is not a basis for negating the value of the technology, but more for understanding ways of conveying its importance and value. Through such processes, it would also seem possible to guard against technological momentum harms.

Harms to sports are also dependent mainly upon how the technology is evaluated. There is no negating the challenge of sport, even if GM is used. It is still necessary to overcome the gratuitous obstacles that are placed before an athlete, even if they are genetically modified. Indeed, the genetically modified athlete will not be so different from the non-genetically modified athlete. It is not expected that athletes will be able to leap over high-jump bars of 3 metres simply by being genetically enhanced. As well, the internal goods of the sport are not compromised by the technology, since the athlete will still be required to train and learn to develop skills. The claims of GM as crossing over some natural barrier do not seem persuasive either, since elite athletes seem already to train their bodies in a manner that could - on similar arguments - be concluded as unnatural. Indeed, in the case of germ-line engineering, it can be questioned whether the intervention is at a point where it can be said to interfere with the natural. There seems more strength in considering that the natural is defined through a process of becoming rather than by a point in time, and that GM takes place during this process of becoming human. Finally, concerns about the enhancement not having been earned by the athlete seem contingent upon the way in which 'earning advantage' is conceived. If it is based upon having to train for such enhancements, then the position seems reasonable. However, with a more elaborate notion of sacrifice and what earning involves, it can include other kinds of challenges that must be overcome in order to use GM. From such a definition, it seems plausible to conclude that GM is earned by the athlete or by the guardian that is choosing such modifications.

This is not surprising, since, within sports ethics, there continues to be a scepticism for the persuasiveness of arguments deriving from sport that seek to outlaw the use of drugs. Indeed, Brown (1990, p.71) considers that,

> the primary cause of so much concern about drugs in sports is that drug use in general, primarily of euphoria-inducing drugs, remains a topic of national hysteria. The vast treasures we spend, the civil liberties that are threatened, and

> the propaganda that is distributed, all tend to mask deeper social problems of which drug use is a symptom....the search for a 'rational' position concerning drug use in sport is no more than the desire to give one's own position, or the position held by one's own community, a legitimacy that is socially, and not rationally, constructed.

Thus, while it is not surprising that greater strength is found in the arguments from bioethics, it is an important conclusion because it is precisely these kinds of harms that are not being considered by sporting authorities. The various 'new harm' arguments can be summarised thus:

1. Boundary Harms
2. Knowledge and Access
3. Engineering Future Values
4. Tyranny of the Normal
5. Genetic Essentialism
6. Life Harms

For each of these categories, it is possible to raise harms that derive from the use of GM in sport. This is not to neglect the importance of sporting values, but rather to understand how a broader harms discourse can contribute to yielding greater strength for positions that rely upon a notion of sporting excellence.

The *boundary harms* imply that the distinction between therapy and non-therapy will be insufficient to prevent the legitimate use of genetic technology for reasons that are not medically justifiable. In particular, a concern for engineering 'social genes' is alarming for it giving rise to eugenics and the devaluing, removal of particular kinds of persons. This also raises concerns for how particular kinds of people (the genetically inferior) will be treated and valued in society.

Knowledge and access issues have been raised in sport in regard to doping tests and the importance of protecting an athlete's privacy through dope-testing procedures. For GM, the potential harms are even more significant because of the variety of interested bodies

that might desire access to genetic information. There is a danger that providing access to the genetic information of athletes will provoke (or derive from) a policy that prioritises *rights to information* rather than of *rights to privacy of information*. The danger of the kind of discrimination that could ensue from this use of genetics is of substantial concern for sports organisations and society in general. Even if genetic information is used to exclude the genetically modified athlete from competition, governing bodies of sport will have to consider provision for such persons if they do not wish for stipulations to conflict with emerging human rights legislation (see, for example, Unesco, 1997).

A further harm arises from the implied values that are associated with likely uses of GM. The most immediate possibilities for isolating performance-genes or boosting muscle-mass are directed at the improvement of physical characteristics. As such, the priorities of such technology are performance-related. This effect is harmful for it conferring a system of values in sport onto future generations. It asserts that what matters in sport is how fast an athlete runs or how far they can jump. This kind of message does not seem to enrich what is valuable in sport and can be considered as detrimental and as an encouragement to neglect other kinds of value.

The *tyranny of the normal* speaks to the harms that derive from allowing the free choice of any kind of genetic modification. The position argues that such freedom will lead to the homogenisation of genetic characteristics and, subsequently, the removal of other kinds. It is important to recognise how this is distinct from institutionalised eugenics, though the concerns are equally alarming.

Related to the tyranny of normalness is the concern for *genetic essentialism.* The misconception that engineering children of a certain genetic disposition will necessarily lead to super-humans is dangerous for it being untrue and compromising valued aspects of being human. Through genetic essentialism, there are pragmatic concerns in relation to the expenditure of important resources. As well, it can cause misunderstandings in relation to what it means to believe that humans might be predisposed to be good athletes. In no way should such information lead to the false conclusion that one can be good at sport simply by having a well-disposed genotype. At most, GM can be seen as an

edge to performance, rather than consisting of the main determinants of being good athletically.

Finally, the *life harms* caused by permitting the application of GM to sport derive from an interest to treat life with a sufficient amount of respect. GM threatens this interest by raising the possibility for commercialising the value of life or treating lives with an inappropriate level of objectification. To consider enhancing one's child to become an athlete raises a concern for how such a child might be treated and allowed the opportunity to direct their life by their own choices and preferences.

These harms extend sports ethical discussions premised upon Kantian notions of respect for persons by problematising the notion of personhood to include respect for life. Identifying these broader bioethical harms that derive from GM in sport reveals a weakness within sports ethics for isolating itself from broader debates in medical ethics (at least in relation to performance enhancement). Indeed, it can be argued that debates in respect of drug taking and doping must engage with broader bioethical ideas to gain a greater sense of coherency. For example, the importance of 'boundary harms' is critical in the ethical evaluation of drug use. Yet, rarely do such discussions in sports ethics borrow from literature in bioethics to derive coherent arguments about why such technologies are ethically problematic.

From these various harms, it would appear that a critical and defining distinction about the legitimacy of GM is premised upon the limits of personal freedoms and the restriction of individual liberty. For example, the harms associated with genetic normalisation (tyranny of the normal) must be off-set against harms derived from preventing freedom over one's body and the lives of children.

For GM, the importance of a casuistic approach gains strength from the many and conflicting effects of the technology. It has not been discussed what harms arise from banning GM, though certainly some people will be worse-off from prohibiting its use. Nevertheless, while there are substantial and significant harms in relation to legitimising GM in sport, there are comparatively few harms associated with banning such

technology. However, this reveals the inadequacy of a consequential approach to the discourse of harms. Indeed, it is not surprising that the integration of a technology has far more consequences than does its rejection, since the latter implies no new consequences for society. Yet, the broader question about what kinds of freedoms, if any, should be restricted in respect of technologies must be considered central to the harms debate, even though they might not be as visible.

This leads the ethical discussion to consider the limits of personal freedom and individual rights - whether athletes should be allowed to use GM to improve their performance. Answering this question, however, is complicated by the broader implications of genetic technology that *do not* involve sport. In many respects, and certainly in the context of early applications of the technology, GM can have a socially relevant and medically justifiable function - its therapeutic possibilities. As such, a restriction of freedoms to use GM implies a number of additional restrictions that go beyond sport and which can impact upon the human rights of athletes. Kidd & Donnelly (2000, p.10) provide an overview of how such rights have evolved, recognising that,

> Human rights legislation has also inspired increasing respect for athletes' rights, the recognition that athletes must be afforded the same protections enjoyed by all citizens, particularly with regard to freedom from discrimination, selection for representative teams, the allocation of other benefits, and discipline and punishment.

Similar discussions can be found in legal discourse about drug-taking and other methods of doping, though it is surprising to realise how such perspectives have not been raised very much in respect of sports ethics. One exception is Thompson's (1982/88) overview of the conditions in which it is morally justifiable to require athletes to submit to urinalysis examinations. Thompson considers that the issue is, fundamentally, a matter of elaborating on *rights to privacy*. Thompson is not alone. Burke (1997, p.50) also highlights the possibility that the "imposition of drug laws restricts the personal freedom of the athlete to explore the limits of performance, without any significant gain for the practice community." Various articles detailing issues in relation to doping test

procedures, recognise that there is a fundamental privacy issue at stake that must be weighed against the importance of fair play in sport (Palmer, 1992).

Within this broader, social scientific study of sport, concerns have arisen about the use of anti-doping measures for catching 'cheaters' in competitive sport. In particular, the "Court of Arbitration established by the International Olympic Committee, National Olympic Committees and the International Sports Federations in 1983" (Kidd and Donnelly, p.10) has been proactive in raising the protection of athletes' rights. Balancing the harms of drug use with the harms inflicted upon the athlete in respect of the invasiveness of doping test procedures has been of significant concern. Parallel ethical issues arise in respect of the provision for sporting opportunities for people with disabilities. Indeed, the way in which disabilities is separated from able-bodied sport might serve as some guide for the treatment of the genetically enhanced (or deficient).

If genetically modified athletes are excluded from competition, then this could exclude a proportion of athletes, who have been modified for medically justifiable reasons. Alternatively, it could exclude a number of athletes who have been engineered before birth and who cannot, thus, be said to have been responsible for the modification. The exclusion of such persons would seem to conflict with an individual's rights to be free from genetic discrimination, as advocated by the United Nations Education, Scientific, and Cultural Organisation (Unesco) Universal Declaration on the Human Genome and Human Rights (Unesco, 1997, html). In particular, the Declaration makes the following stipulations relevant to the present discussion,

> Article 2: Everyone has a right to respect for their dignity and for their rights regardless of their genetic characteristics
>
> Article 5 e): If according to the law a person does not have the capacity to consent, research affecting his or her genome may only be carried out for his or her direct health benefit, subject to the authorization and the protective conditions prescribed by law....provided such research is compatible with the protection of the individual's human rights
>
> Article 6: No one shall be subjected to discrimination based on genetic characteristics that is intended to infringe or has the effect of infringing human rights, fundamental freedoms and human dignity

With these articles in mind, the requirement upon sports authorities to be reflective of their legislation in relation to GM seems unequivocal. A priority in biomedical ethics and sports is to arrive at ethically informed policies about genetics. Legislation made within the context of sport and in the absence of recognising broader bioethical debates, will be insufficient to protect individual freedoms. For this reason, it cannot be concluded that it is straightforward for sporting authorities simply to reject GM from sport on the basis of sports ethical arguments. Banning genetically modified humans from sport implies discriminations that have implications beyond the sporting case. Unesco's declaration must extend to the sporting context, particularly since sport aspires to the championing of moral rights and equality norms. There has to be a space where the genetically modified athlete can compete, even if it is separated from non-genetically modified sports. Consequently, in the discussion about paternalism in respect of GM in sport, it is necessary to consider arguments from within sport and in the broader bioethical community.

It is also important to recognise that paternalistic arguments have their roots (particularly within the doping issue in sport) in the salience of *physical* harms, a perspective that does not have such strength in the case of GM (except in respect of its abuses). It has been dismissed that GM would be overly detrimental to the athlete's biological health. Consequently, other kinds of harm are the basis upon which the discussion of paternalism must be premised. Yet, as well, the paternalist view is premised upon seeking to protect individuals from themselves. Such positions consider that social authorities are justified in restricting freedoms on account of wanting to protect individuals from themselves (Brown, 1985). From the sporting perspective, this approach has been particularly relevant in the context of drug taking and doping. In this respect, the perspectives of Simon (1984) and Brown (1984) are summarised by Fraleigh (1984a, p.24),

> they locate the issue in whether or not it is morally right to restrict the choices of an informed consenting adult athlete in taking drugs for the purpose of enhancing performance while accepting serious risks of harmful side effects.

However, the justification of paternalism in the case of GM has a quite different basis. It is not so much a concern for harms to the individual, than it is a concern for harms to others (in the broad sense). Admittedly, within Simon's and Brown's formulation of the issue, they consider the importance of issues related to fairness and coercion, thus recognising the harms to others. However, it is an important distinction to recognise that GM does not respond to the kinds of harms that have built a case against the use of drug-taking and doping in sport. In this respect, the arguments have their roots in John Stuart Mill's (1859, pp.73-74) 'harm principle' that states,

> As soon as any part of a person's conduct affects prejudicially the interests of others, society has jurisdiction over it, and the question whether the general welfare will or will not be promoted by interfering with it, becomes open to discussion. But there is no room for entertaining any such question when a person's conduct affects the interests of no persons besides himself, or needs not affect them unless they like (all the persons concerned being of full age, and the ordinary amount of understanding). In all such cases there should be perfect freedom, legal and social, to do the action and stand the consequences.

Importantly, the balancing of these harms requires more than Mill's classic utilitarianism for deriving ethical guidelines regarding GM in sport. The degree of restrictions to personal freedoms that are implied through banning GM in sport have far broader implications than does banning drug use. At most, a similar claim that can be said of banning GM is paralleled in the prohibition of *recreational* drugs from sport. For example, in 1998 at the Nagano Olympic Winter Games, a controversial case arose in respect of Canadian snowboarder, Ross Rebagliati, winner of the first-ever gold medal in the snowboarding giant slalom at Nagano. Only three days after winning the gold, the I.O.C. asked Rebagliati to return the medal after it was discovered that he had tested positive for marijuana.

Further details about his innocence or guilt are less relevant here than the notion that a recreational drug (non-performance enhancing) is of interest to an anti-doping policy. The example was controversial since it brought into question whether the list of banned substances ought to be extended to non-performance drugs. For some, the Rebagliati case entailed an unwarranted violation of the individual's personal freedoms and

overstepped the realms of the paternalistic power of sports authorities to restrict what an athlete can and cannot do. Marijuana is a depressant and, arguably, not considered as enhancing of a snowboarder's performance. As such, it is not clear why it was deemed illegal for specific sports.[31] For GM, there is an even stronger case for considering whether sporting authorities should be entitled to discriminate against genetically modified athletes as the following overview conveys.

In respect of genetic testing and pre-selection, the banning of such technology implies substantial restrictions upon parental freedoms. Currently, parents enjoy a freedom to raise their children as they see fit, excepting some important, fundamental legal requirements in relation to the protection of a child's right to welfare. In comparison, the restrictions in regard to the participation of children in elite sport, are few. Indeed, Kidd and Donnelly (2000, p.12) recognise that "no one has yet taken this approach [a legal means to address human rights violations] to pursue children's rights in sports". There exist no restrictions to prevent parents of young children from placing them into elite sports training clubs and it is only recently that age limits are being set to outline the extent to which children should participate in elite sport. As well, the process of talent identification and competitions, which leads to the selection of elite teams is integral to and a respected aspect of sport. Again, for these kinds of practices, it is not considered unethical (or something to be prohibited) that parents ought to be restricted from placing their children into such clubs. Genetic pre-selection and selection involves a similar kind of process and so similar claims to their being accepted can be made.

Nevertheless, there is a significant difference between these two kinds of talent identification process in the way in which they are achieved. The kinds of process that might go into testing a child or embryo for genetic characteristics can be more invasive than are traditional scouting methods. For this reason, there might be grounds for concern. However, if genetic screening is justified and used on a health-related basis, then such information might already be available to talent scouts. In such circumstances, the child will not have to go through any additional or harmful procedure to that which is medically necessary. Rather, it would simply be a case for the parent to authorise the use of such information as a basis for selection in elite sport.

Again, this brings into question who should have access to genetic information, and upon what basis its use is justified (Ayabe and Tan, 1995; Burley, 1999; Gorner, 2000; Keyley, 1996; Knoppers, 1999; Sandberg, 1995). Where the freedom to use such information resides with parents, its use could be immoral in a similar way to how one might consider the use of abortion on account of sex-preference as immoral. Consequently, it must be questioned whether parents and other interested parties are entitled to use the genetic information of their children in ways that they see fit or whether such information does not belong to them. Raising doubt for such use implies a substantial rethinking of biomedical ethics. Regardless, the potential for discrimination that can derive from genetic screening is substantial. Indeed, Harris (1998) considers that, if genetic screening is used, then there is a need for legislation to control the potential for discrimination. This could imply a significant restriction of parental liberties.

A similar issue arises out of germ-line GM for sport. In this context, the significant challenge for bioethics, gains greater clarity. On the current ethical premises of bioethics, legislation would confer responsibility upon the discretion of parents to restrict their authorisation privileges in relation to their child's health. Importantly, this does not imply that a parent could choose to create a super-athlete. Such sensational ideas are not even near what is immediately alarming about such technology and what it means for parental freedoms. Rather, recalling the Unesco (1997) Article 5, parents will retain the right to consent for their child in respect of those applications of genetics to dependants, where such applications are deemed conducive to health. Thus, the use of GM at all *is* governed by the ethical limits of parenting and medicine.

This conclusion presents a significant and controversial barrier to the discussion. Parental freedom is of critical importance in bioethics, which has a tradition premised upon the legal definition of *autonomy*, particularly within the U.S. which has driven a great deal of biomedical law. Wolpe (1997) recognises that bioethics prioritises individual autonomy and that this must be understood as problematic for resolving discussions about ethics in medicine. This consideration is relevant in the discussion about paternalism and freedoms in sport by critiquing whether individual freedoms

should be prioritised. Wolpe and Platt (1998) suggest that individual rights should not champion other kinds of rights, despite the tradition of doing so and the pragmatic and democratic appeal that such principles imply. Thus, challenging parental freedoms by restricting what kinds of technologies are legal - as has been the case through IVF - conflicts with a significant principle within bioethics: *autonomy*. As Harris (1999, pp.89-92) explains,

> matters involving the most intimate and personal choices a person may make in a lifetime, choices central to a person's dignity and autonomy, are central to the liberty protected by the Fourteenth Amendment....decisions to reproduce in particular ways...constitute decisions concerning central issues of value, then, arguably, the freedom to make them is guaranteed by the constitution (written or not) of any democratic society, unless the state has a compelling reason for denying them that control.....European Union...would have to show that more was at stake than the fact that a majority found the ideas disturbing or even disgusting.

GM in sport challenges the sanctity of such a premise by raising doubts about the limit of parental freedoms. Parenting in western societies has enjoyed a relatively loose level of regulation in the past. Indeed, the concept of 'informed consent,' which serves as a fundamental tool in health care, confers authority upon parents to make decisions on behalf of their children. However, the degree to which this is useful where GM is available, can be questioned. The utility of practical ethics here can be to advocate more of a discursive approach that involves a process of deliberation between respective interest parties, rather than appealing to such tools as *informed consent*. While such an instrument has great importance in the ethical provision of medical care, Elliott (1999) recognises that it has important limitations in cases where consent does not necessarily concur with the best decision. Consequently, it is essential that further investigations within sports ethics, particularly from the perspective of sports authorities, recognise this broader implication of implementing restrictions upon what kinds of person are allowed to play sport.

It is necessary to re-visit the moral and legal limitations of sporting authorities as a step towards concluding the ethical status of GM in sport. A question must be asked about, whether governing bodies of sport can prohibit certain kinds of freedoms for athletes. It

is relevant to consider what kind of role athletes hold within sports organisations. If athletes are considered as professionals and sport is recognised as a work environment, as it is for many professional athletes, then this might have a bearing upon what can be asked of the athlete. While it is not possible here to expand upon what kind of human practice sport is, it is a critical discussion in developing a legal and ethical response to the freedoms of sporting authorities. Such conclusions will also provide greater clarity on the requirements upon athletes to submit to the professional codes that might ensue as a result of such circumstances.

In the absence of a clear articulation of sport's 'special' status, sporting authorities must be sensitive to the broader implications of decisions about genetics. If governing bodies of sport reject any form of genetic manipulation from competition, then this has implications for the rights of the modified athletes. Undoubtedly, current trends indicate the need to submit sports ethical principles to medical ethical ones. However, this does little to expand upon the rights of sports persons. Rather, it simply retreats from problematising the issue, to applying inadequate medical ethical principles to contexts for which they have not been developed.

The freedom to use genomics or somatic-cell GM rests solely with the athlete and the freedom of sports authorities to limit such choices. In this respect, the discussion is conceptually similar to the issue of drug use. Again, recognising that the use of such technology would not imply a detrimental effect upon the athlete's health, then the position favouring the paternalism of sporting authorities seems relatively weak. Nevertheless, if the intention is also to ensure that an abuse of such technology does not take place, then it would seem important to consider recent trends within anti-doping discourse, which recognise that the athlete is not an isolated human being. In respect of drugs, it requires a significant number of people to create the drug-enhanced athlete. As such, anti-doping measures must take into account the potential for the athlete to be manipulated by others into using new methods of doping, which is the ethical basis for paternalism. A stronger claim can be made in respect of GM, where the athlete will be dependent upon medically cognisant professionals. Again, isolating the athlete as solely culpable for using GM would be naive.

The argument from harm and the subsequent discussion on the moral limits of paternalism and individual rights, requires further elaboration. Thus far, it seems clear that governing bodies of sport are in a rather difficult predicament, where harms will ensue in whichever decision is made about the ethical status of GM in sport. For this reason, it is critical that the ethical status remains open to the possibility that legalising GM might be more desirable than banning it. It is not sufficient to expect a concise answer to the question of whether GM is appropriate for sports. Some of its applications seem, at most, as harmful as currently *accepted* methods of performance enhancement. Others raise new harms, but their rejection from sport on account of some idealised conception, conflicts with the sustaining of individual rights. Further discussion must take place to problematise the relationship of the athlete with the sports organisation and as a human being in society, who also is beholden to medical ethical dictates.

One initial response to this harmed group is to question whether one has an entitlement to expect *not* to be disadvantaged by one's genetic disposition. Such a view is affirmed by the Unesco (1997) Declaration, though it is not clear that such entitlement is sustainable or that it leads necessarily to legalising GM for sport. Nevertheless, this is where the inconsistency of sporting values is revealed. If the aspiration is for equality of opportunity and to ensure the possibility of fairness in sport, then sports ought to aspire to such circumstances. It is not sufficient simply to dismiss from sport, persons who were not born with the right predisposition. Organised sport adopts responsibilities by purporting to be aspects of human practice where ethical policies are important. Thus, sports authorities could not simply ban all kinds of genetically modified humans as they could neither neglect genetically deficient humans in sport.

A further consideration to understand what harms arise from disallowing the use of a given technology can be identified within the bioethical context of allowing or preventing treatment. Indeed, this argument relates back to the consideration of harms deriving from banning GM. Where technology is available to treat a patient with some genetic disorder, and such treatment is not administered, it can be said that this person

is harmed by not having been treated. The example raises a different approach for understanding harm, which has yet to be recognised in the context of sport. This is not surprising since the harms are not obvious, but rely upon a projection or speculation about what might have existed had such a ban not been implemented. This is not a straightforward example, since the question about whether one is harmed by inaction is contested. Nevertheless, it is recognised by Rachels (1986) that such claims can be made. In the case of euthanasia, Rachels considers that inaction is more reprehensible than active euthanasia. As Rachels describes it, inaction is doing something, it is doing nothing. Consequently, a patient who has not been treated for their condition can have a justifiable claim to have been harmed, because there is an expectation that, if something can be done, then one has a right to it being done. Alternatively, if doing anything implies more suffering to a patient than would terminating the life, then the former is less humane and thus, more immoral.

This tendency to translate issues of morality into a rights discourse can be limiting insofar as it empowers the individual rather than the practice. In the case of euthanasia, if the patient has a legal right to expect doctors to do something, then the medical profession has no choice but - from one perspective - to commit murder. However, this consequence for the medical profession is a matter on which its members might also claim a moral right to abstain from accepting any responsibility. Thus, while a discussion of rights is important, it also marginalises concerns related to the good of a community. A more communitarian approach to morality might thus, be a direction for future research concerned with GM in sport. As well, premising moral debates about GM upon a rights discourse gives priority to a deontological framework for understanding ethical issues, which does not seem useful where cases of genetic technology seem to vary substantially. The derivation of (and hope for) a system of moral decisions about medical issues cannot be an aspiration of an ethical analysis of GM in sport. In this context, any such moral theory seems confounded by the variety of interests that are served by the technology and by the various kinds of technologies that might be used.

However, the current argument tends towards concluding that the basis upon which GM in sport must be evaluated, is upon a notion of human *autonomy*. The degree to which an athlete (qua human) is entitled to use genetics and, importantly, be genetically modified in such social practices as sport, involves raising the difficult question about the extent of freedoms. It also requires problematising the epistemological basis of autonomy. Kahn (1997, p.119) defines autonomy as a component of human dignity that consists of the "indeterminability of the individual with respect to external human will" . However, as Harris (1998) points out, the definition is hopeless, as it would include as autonomous, individuals in a persistent vegetative state and even newborns. Consequently, deriving guidelines about the legitimate use of GM in sport on the basis of the current articulation of autonomy is insufficient. While the right to procreative autonomy is a strong one, it is not beyond question. Thus, in this respect, further research must seek to problematise the medical definition of autonomy, in order to arrive at coherent policies about the ethics of GM in sport.

5.3 On Humanness and GM

In respect of humanness, it has been argued that understanding the acceptability of GM relies upon an elusive notion of what constitutes the human being (in sport). The analysis reveals a theoretical weakness with the way in which previous research has approached the question of humanness, particularly in sports ethics. Thus, seeking to base a concept of humanness upon some biological articulation of what is natural is insufficient, particularly within sport where the integration of humans and technology is extensive. In response, the argument develops a notion of personhood premised upon ideas within sports ethics and bioethics. Within sports ethics, arguments that have sought to ground a rationale for understanding why drug use is unethical, build upon Kantian notions of respect for persons. Yet, the problematising of personhood has received only limited discussion. Moreover, the importance of understanding humanness through the notion of personhood has been overlooked as a basis for arguing how performance enhancing technologies alter what it means to be human. As such, if rational arguments are sought to support reasons why GM is unethical upon a basis of what is human, then they must be grounded in arguments about personhood.

Within sport, the concept of personhood is threatened by the use of GM because it implies circumventing that which seems to give sports value: the human. GM provides capabilities that are not derived from the human athlete. As such, it brings into question the degree to which sports performances are interesting because of them being human performances. The basis for this disturbing consequence is, importantly, not that technology is responsible for breaking world records. Rather, it is alarming since it raises questions over the personal identity of an athlete. Yet, as was recognised in the discussion, this is not a sufficient basis upon which to reject GM. Indeed, in many respects, athletes already use commonly accepted methods of performance enhancement that could also be said to compromise their performances as being human. This might simply beg the question as to whether such technologies should also be allowed. In this case, if the appeal of ethics is, indeed, to such a concept of humanness, then it would seem reasonable to question the relevance of performance enhancement at all in sport. From the discussion, it seems clear that there are fundamental contradictions in the way in which different kinds of technologies are made acceptable or not, which do not follow some clear articulation of what makes sports valuable.

For now, appealing to an obtuse sense of what is human as a basis for rejecting GM lacks persuasiveness given the current state of elite sport. As well, to consider the athlete as a person in isolation of the athlete as a technology user, misunderstands the way in which an athlete engages with sport. From this view, the use of GM and other technologies fits within a notion of personhood that places the athlete at the centre of using the technology. In this way, it continues to be the athlete who is utilising the technology. They remain autonomous in the situation and can be said as exhibiting characteristics of personhood.

Nevertheless, the concept of personhood is offered as a starting point for the discussion. Its utility is not prescribed by the arguments raised in relation to sport, nor essentialist in these conclusions. Rather, the notion of personhood has evolved in the discussions about GM in sport from trying to understand how to make sense of defining humanness from the perspectives of sport and bioethics.

From sports ethics, personhood has been explored further and informed by perspectives in bioethics, where its importance has been critical in problematising conventional ethical conclusions that derive from bioethical principles in various applied contexts. In particular, issues of euthanasia, abortion, and genetic experimentation with embryos, have been alarming for the very reason that they seem to threaten an intuitive feeling that they are contrary to what is being human. From these discussions, personhood has evolved as a means towards recognising that the moral significance of life evolves gradually, as an embryo develops, and entails the possession of certain attributes (Macer, 1990). The qualities attributed to personhood provide some basis for establishing whether GM in sport violates some articulation of what it means to be human. However, there still lacks agreement about whether personhood is an adequate concept upon which to base ethical discussions in medicine and technology.

For example, the characteristics of personhood do not preclude affording the same level of treatment (or respect) to non-humans as is given to humans. From personhood, the conclusion could follow that a sentient animal is morally equivalent to a human being. This is because the basis of the argument towards the protection of humanness is not based upon some species barrier. The basis of distinguishing humanness (or the species argument) has been rejected along with the biological articulation of humanness. Consequently, if another entity possesses the characteristics of personhood that give it moral significance, then such an entity is also included considered to be worthy of respect and to be afforded certain rights. The clarification is important since it is often used to reject the approach from personhood for leading to an insufficient articulation of what is human. Indeed, it is accurate to accept that the conclusions do not lead to an articulation of what is human say, in comparison to what is non-human. However, this very manner of phrasing the argument has been rejected. The discussion and the conclusions that now follow, dismiss seeking a distinct notion of humanness and respond to such discussions as being conceptually flawed. Consequently, the thesis is not vulnerable to critiques of speciesism.[32]

Yet, the argument does lead to counter-intuitive conclusions about the status of some kinds of life compared with others, as was noted by Tooley (1986). Tooley rejects the idea that humanness has a special status and argues that personhood is a concept served simply to assert an unjustified superiority of some kinds of lives over others. Personhood prejudices the value of lives that do not have such characteristics, but which can certainly be called human. Thus, in cases of human life where the characteristics of personhood might not be satisfied, it would, on Tooley's view, lead to the treatment of that life as sub-human. Indeed, from the view of personhood as a basis for establishing what is valuable about sporting performances, it would not find any difficulty with terminating lives on the basis of them lacking certain personal qualities.

In response, it can be argued that Tooley's work points more to a need for a greater articulation of personhood than to its rejection. In the cases raised by Tooley, it might be satisfactory to concur with Egonsson (1998, html) that,

> I do not think that it is possible to give a rational defense of speciesism, since all the attempts in that direction that I have seen have failed. But given the fact that the speciesistic attitude exists among us, whether or not we are able to justify it, then I believe it has to be taken into account.

However, if one still finds weaknesses in the moral importance of a feeling that humanity has a special status, then it must follow that non-human persons are deserving of respect and that some kinds of humans might not be. This does not mean treating such lives without any respect at all. Rather it might simply entail applying Warnock's (1987) notion of *minimal rights*, where it is identified that the embryo has a special status, demanding special rights that respect it as being human and definitely alive, though which recognises that it is far from being fully human. A comparable conclusion is made by Fleming, who endeavours to make more explicit the extent of the rights to be afforded to the human foetus rather than the embryo. In re-stating the Minimal Rights position, Fleming identifies that the interests of the human foetus for continued existence make problematic the use of experimental genetics that would allow the development of enhancing techniques. Similar conclusions are implicit of UNESCO's (1997) declaration on the human genome, though still does not necessitate the inability

to engineer the human genome accepting - at least - Warnock's 14 day limitation upon the human embryo (that until 14 days after conception, the human embryo cannot be harmed and could thus, be used for experimentation - providing such research is respectful of the humanity of the embryo). Adopting the minimal rights position and the special status of the embryo (though not to treat them as the same) does not appear, necessarily, to violate the rights of the embryo and thus, can be argued as satisfying the first assumption of this paper.

A further challenge that must be reconciled is for expanding notions of respect for personhood, to the abstract entity rather than the specific person. Schneider and Butcher identify some recognition of the importance of affording respect to entities other than lives, by introducing their notion of *respect for sport*. Thus, further work must account for how personhood, and the characteristics ascribed to it can apply in greater strength to the concept persons or humanity in general. Birnbacher (1998) describes such a process as moving from a discourse of *want-regarding* to *ideal-regarding*. It entails moving from an ethical discourse that prioritises individual rights to use certain technologies, to those that recognise there are some applications of technologies that must consider the importance of issues beyond the specific, individual preferences. However, the latter of these perspectives (ideal-regarding) is far more difficult to sustain within the current ethical climate. As Birnbacher (1998, html) explains,

> You are on much safer ground, epistemologically, in claiming preference-satisfaction as an objective value than making the same claim for preference-independent values like human dignity (in some of its senses), sanctity of life or ontological harmony.

From bioethical articulations of personhood, the importance of human dignity is often given as a benchmark for the ethical limits of genetic technologies (outside of sport). As Rendtorff (1998, html) describes,

> The principle of human dignity signifies that human beings have a special position that places them over the natural and biological position in nature. As a moral being and because of its status as a human being the notion of "dignitas" is contributed to its intrinsic value and place in the world. From the beginning it emphasized this out-standing position of the human being in the universe.

The concept considers that being human has an inherent, objective value; it is not simply that humans regard themselves as special, but that there exists some measure external to the human judgement that would also ascribe such special status to being human (Egonsson, 1998). Nevertheless, the concept of dignity also encounters difficulties of application in relation to medicine. Harris (1999) outlines how dignity is but a starting point in the discussion of what is valued about personhood. He considers that, while human dignity is a universally attractive concept, it is also terribly vague. In respect of genetic technologies, Harris argues that the onus must be upon demonstrating how human dignity is challenged by the technology. Simply applying Kantian principles does not suffice in this respect because it, too, is rather ambiguous. The principle of treating persons as ends in themselves implies an unsustainable requirement upon interpersonal relationships. As Harris (1990, p.70) argues,

> almost all commercial relations people have with one another are basically instrumental ....there is a difference between treating someone as a mere thing and recognizing his or her humanity.

Consequently, it is misleading to conclude that the ethical issues concerning GM in sport are resolved simply by applying the principle of protecting human dignity in order to preserve some valued aspect of sport.

5.4 Summary: Autonomy, Dignity and GM

On the basis of these central moral issues in relation to GM in sport, there would appear to be some common characteristics. The discussion about harms identifies that a critical aspect to develop is the notion of autonomy and the salience of it as a guiding moral principle in relation to the use of scientific and technological innovations. From this perspective, determining whether GM in sport should be allowed requires concluding what is an acceptable balance between the prevention and restriction of individual freedoms. Concluding whether GM in sport is ethical, relies upon the limits of personal autonomy.

The discussion of humanness leads to a concept of personhood that seems inextricable from the notion of human dignity. In this respect, Kant (1785) would seem to offer a common context for understanding how each is related. Specifically, Kant asserts that "Autonomy...is the basis of the dignity of human and of every rational nature" and "dignity of humanity consists just in this capacity of being universally legislative" (html).

For each of these concepts, there is a lack of consensus that they are sufficiently articulated to be of use to bioethical issues, which is rather pessimistic for the aspiration of reaching ethical conclusions about the sporting case. The overuse of *human dignity* lacks depth because of the incoherent articulation of what constitutes personhood and how it 'hangs-together' in respect of a variety of moral issues. On Kant's view, the discussion might seem somewhat tautological as the concept of human dignity consists in it reflecting a capability (and desire for) autonomy as a fundamental moral principle and human right. Again, it is important to recognise the dangers of the discussion being reduced to discussions about human rights, to which each of these concepts is closely associated.

Presently, human dignity seems to entail giving a respect to the autonomy of the individual. However, human dignity is also contingent upon a statement about what is human and thus, what is deserving of autonomy. It is the latter of these issues that requires further articulation. Thus, further research must investigate the concept of personhood and understand how it can apply beyond a rights discourse - beyond empowering the individual to empowering the status of abstract concepts such as humanness. The final section of the analysis of 'dehumanising and superhumanising' recognises that a further challenge to the application of ideas from personhood and human dignity rests upon their extension to abstract persons or a community of persons. As is shown by the 'new harms' of GM, a number of the significant harms in relationship to genetics are harms to future generations and the development of disturbing eugenic tendencies that might derive from any regulation on using such technology. Unfortunately, the concept of human dignity and the discourse of rights does not offer much by way of solutions to these concerns since they only empower individual rights. Comparatively, the rights of potential persons is a weak argument

(Birnbacher, 1998) if, indeed, it is an argument upon which to base any decision about the use of technology. Consequently, work is necessary to consider what kinds of modifications to rights discourses might be necessary to account for harms that are not demonstrably inflicted upon individuals.[33]

A rights discourse seems useful to employ to negotiate these concepts, but a *reflective* rights discourse is needed, which recognises that conventional human rights as indicated by such international instruments as the Universal Declaration on Human Rights (1948) do not account sufficiently for genetically modified humans within social practices. Indeed, it reveals that human rights are premised upon relatively shallow articulations of what is being human and the limits of claims to freedom.

Dignity and autonomy provide some basis for inquiry and so, contrary to Schneider and Butcher (2000), there is a starting point for entering into discussions about what makes humanness an important factor in considering the ethical status of performance enhancement in sport. Importantly, this call for sports ethics to enter into a rights discourse that is informed by bioethical arguments, evolves from the case. It is not the end of the discussions, but a starting point that follows from a conceptual framework about the ethical issues arising from technology. It serves as a basis for the deliberations of harms, from which it is possible to discuss what is meant by being human. As such, the discussion should not be limited by the importance of rights, but should be preceded by a greater articulation of what are dignity and autonomy.

In sum, it would seem that sporting authorities would find it difficult to prevent harms or sustain sporting values, regardless of the decision to ban or legalise GM. The harms of legalising a technology do seem more transparent than the harms of banning the same technology, perhaps because legalising presents new kinds of harms for people. Further people will suffer by the implementation of a technology, but only the same kinds of harms remain by not allowing it. Here, the approach has been to show that GM is *not necessarily* an unethical method of performance enhancement in sport. It has not been to champion the positive aspects of GM or to consider broader social questions about GM in general, each of which is relevant to the implementation of GM

in sport. Rather, it has been to demonstrate why GM might be an acceptable method of performance enhancement and reveal what should be the focus for ethical research in relation to sport technology

Within this thesis, it has been suggested that arguments based solely upon sports ethics are not sufficient. At best, the current positions within sport seem to assert a self-justifying and hypocritical position about what kinds of performance enhancer should be made illegal or legal. Additionally, there has not been a sufficient level of analysis within sports ethics to locate a variety of performance enhancements within a common conceptual framework. Indeed, discussions have been focused solely upon the drug issue, to the neglect of a vast number of other technologies that confer a similar kind of effect. Only recently have the ethical issues deriving from performance enhancing technology in sport been given serious attention. It is not that sports values are insufficient to derive conclusions about why GM is unacceptable, but that bioethics indicates a broader literature that is not dealt with through the current arguments raised against drugs, and other enhancements. Such arguments inform and strengthen the claims to what is valued in sport and provide a more substantial basis upon which to derive conclusions about the ethical limits of GM in sport.

From the sports ethical perspective, banning GM is not justified. However, if sports ethics borrows from perspectives in bioethics, then GM in sport gives rise to some significant ethical concerns, which then sharpen the credibility of the sporting arguments. Such analyses allow a clearer articulation of values in sport, as demonstrated by concluding the ethical limits of GM in sport as reliant upon the philosophical limits of autonomy and dignity

6. Post-Script: Avoiding "Gene Doping"

As a post-script to the main conclusions, it seems useful to provide some final recommendations for the preceding discussion about the use of genetics in sport. These comments have been formulated on the most recent developments in regards to the genetics issue in sport, which have not been possible to include within the main framework of the thesis. While it is fundamental that ethical inquiry works towards dealing with the conflicting freedoms of individuals and institutions, and expands upon humanness in relation to medicine and sport, it seems necessary to recognise the immediacy of the issue in respect of sport. Within the sporting community and within medicine, this debate has already begun to take place, though is already clouded by a fear and condemnation of GM for sport. Nevertheless, an interest in genetic modification for sport has gained a substantial amount of academic attention within science and ethics. Subsequent to this research, there is a need to more clearly investigate the broader implications of how genetic technologies raise issues for the rights of athletes (Miah, 2000b; 2001b). As well, research must look more closely at the legal implications of genetic-policy in sport. Each of these issues would appear to have passed unnoticed thus far and have not been the explicit intention of the present study. However, the Unesco (1997) declaration and a recent paper published by the Australian Law Reforms Commission (2001), flags each of these issues as a priority in relation to ethical and legal issues about genetics and sport.

6.1 Review of current positions

Scientific Research

Over 2000 and 2001, there have been a number of academic and professional meetings that have devoted time to the consideration of GM in sport. These include, but are not exhaustive of the following:

- July 2000, European College of Sports Science

- September, 2000: Pre-Olympic World Congress of Sports Science & Medicine, Brisbane, Australia.
- September, 2000: International Association for the Philosophy of Sport, Melbourne, Australia.
- March, 2001: Playing the Game, Denmark.
- June 6, 2001: IOC Working Party, June 6.
- November, 2001: Genes in Sport: A Seminar, School of Medicine at University College London and UK Sport, London, UK.

Additionally, WADA had planned to hold a closed meeting in Spring Harbour in September 2001. Due to the terrorist attacks on the World Trade Centre on September 11, this meeting did not take place and was re-scheduled to March 2002. The meeting consisted of a number of experts within genetics and sport. Dr. Theodore Friedmann, geneticist and member of WADA's medical research committee stated that, "The geneticist doesn't know a lot about the world of athletics, and the world of athletics doesn't know what is happening in the gene therapy world". As such, the meeting intended to provide an "opportunity for both camps to bring themselves up to date on the state of the art and what the potential dangers are in athletics through genetic manipulation" (Freidmann, cited in Wilson, 2001, no page). What has not been apparent from the planning of this meeting is the degree to which ethicists will be involved or the degree to which ethical inquiry – rather than the straightforward implementation of ethical rules – will take place. It is possible to argue that geneticists, most of whom are medical doctors, are cognisant with principles within medical ethics. However, to claim that a doctor is also an ethicist is grossly misconceived. Indeed, it might be akin to claiming that a bioethicist is also a medical doctor, which is clearly not the case.

The main part of this thesis intends to demonstrate that the issue of genetics in sport cannot rely solely upon medical ethical principles. Thus, if the geneticist departs solely from conventional medical ethics, then this is not a sufficient basis upon which to consider the ethical status of genetics in sport. Indeed, it is paramount that any such discussions include members who are aware of ethical issues in relation to sport and

medicine and who have expertise in ethical reasoning. This does not imply the championing of the ethicists as moral guide. Indeed, the trend in genetic counseling that is pervading medical ethics is not to utilise the ethicist as a decision maker, but more as a facilitator of understanding and clarifying ethical dilemmas. Thus, it is to recognise that the ethicist has an important role to play and an expertise that requires consideration in the making of policy. This perspective is consistent with the way in which genetics is being dealt with on an international basis outside of sport. The presence and role of ethicists is of immediate relevance to such bodies as the UK Nuffield Council on Bioethics, the International Bioethics Committee of UNESCO, and many others. Again, the ethicist is not the sole voice on such matters, though is one that has something unique and interesting to add to these discussions.

The perspective of geneticists outside of sport remains sceptical. Indeed, it is not clear that genetics will give rise to effective therapeutic techniques at all. Professor Steve Jones of UCL, one of the world's leading geneticists, spoke at the 'Genes in Sport' meeting hosted by University College London and UK Sport. No fan of sport, Jones was thoroughly dismissive of the possibility that genetic technology might be applied to sport, saying that

> There is a massive quantity of hype when it comes to gene therapy in sport. I put it in the same ballpark as the babbling nonsense talked about a baldness cure based on gene therapy. (Jones, cited in Powell, 2001, no page).

One might take this response to be rather jovial, as Jones also adds that he wished "genetics had never been invented" (Jones, cited in Hamlyn, 2001, no page). Thus, Jones' reaction suggests more a contempt for any of the speculations on how such information might used, rather than specifically directing his response to the application to sport. However, Jones is not alone. Professor Tom Murray, of the Hastings Center for Bioethics Research in New York, said isolating a gene for any characteristic, sporting or otherwise, is too simplistic a notion. He argues that

> Those that believe you get simple effects from genetic manipulations see our genes as beans in a beanbag – you add or pull out a bean and get the effect you seek.....

> see it as a complex ecosystem with each gene influencing and being influenced by others and the external environment (Murray, cited in Morgan, 2001, no page).

Consequently, the serious consideration of how such technology might be used for something so 'trivial' as to enhance sporting prowess is regarded as being far-fetched. In this respect, scientific opinion is divided, though is erring on the side of caution. Nevertheless, genetic research is taking place in relation to sports performance and will be informed by other kinds of research that can have findings that will be useful for the elite athlete to enhance performance.

Media

These academic considerations of genetics in sport have been accompanied by a wealth of media attention from around the globe, reaching publications in medicine, science, ethics, and sport. On many occasions, this attention has been sensational and has sought to ground hysteria about the possibility for creating super-humans in sport. Indeed, one might attribute the rather dismissive response from scientists such as Steve Jones to the amount of bad press that has been written about genetics and sport. This is neither surprising nor unusual, though is important to consider. A similar argument can be made in respect of cloning, which has gained vast amounts of press attention in the last 3 years, but which remains relatively innocuous as a new application of genetics. Interestingly, academic responses to cloning tend to be rather dismissive of it as raising significant ethical issues. Arguably, it has become typical within academia to dismiss the ethical issues of cloning as special and thus, deserving of specific consideration. It might be questioned whether media hysteria tends to provoke sobering reactions among ethicists, or whether there really are no vastly significant ethical issues in relationship to cloning. In respect of sport, a similar claim can be made. The press has given rise to some vast speculations that are not in keeping with near likely scientific applications. Had such reports been rather more cautious, then there might have been a more considered view about the ethical issues and scientific possibilities associated with genetics and sport.

Nevertheless, there have been some credible articles that have interviewed key persons within international sport and genetics research. In particular, Morgan (2001) speaks with eminent scientist Claude Bouchard, director of the Pennington Biomedical Research Center in Baton rouge, Louisiana. On the possibility of isolating performance genes Bouchard is no longer convinced, stating that, "the human genome map has shown the situation is more complex than we believed....Even clear targets, involving a single gene or small group of genes, may require another century of research." (no page).

Athletic Community

As well, there have also been responses within the elite athletic community that provide some awareness and expressions of concern for GM in sport. In general, these responses are from the usual key, political figures, though still offer some context for understanding the athletes' views. In particular, Johann Olav Koss, the 1994 Olympic speed skating champion from Norway, member of the I.O.C., and medical doctor, asserted that, "methods could have already started (cited in Longman, 2001, html). Koss, also claims that there is a need for aggressive strategies in the development of gene-doping policies.

> We have to do this in the early stages before any athlete starts using this. We need to act quickly to define the rules. I don't think sport has anything to benefit from having genetically enhanced athletes. This is not only an issue for sport, it's a broad ethical issue for human beings (Associated Press, 2001, html).

Additionally, Sydney 2000 Olympic Gold Medal winner for the men's 100m, Maurice Greene raised the issue pertinent to the potential for engineering germ-line genes, asking, "what if you're born with something having been done to you....You didn't have anything to do with it." (cited in Longman, 2001, html). It is reassuring that the athlete's perspective, at least from this brief statement, recognises that the ethical conclusions are not foregone or straightforward to apply. Also from the sports field, US women's national team coach Harmut Buschbacher has claimed that it would be desirable to obtain the genetic profiles of young rowers:

> As a coach, I'm interested in performance...and if this information would give me a better opportunity to select the athletes for my team, I would like to use that. [That way] you're not going to waste so much time and energy on athletes who may not be as successful. (cited in Farrey, 2001, html).

A similar interest in genetic screening is offered by one of the US national team rowers, Amy Fuller, who said "I mean, my mom started me in ballet....What a nightmare that was. Didn't have the grace gene, obviously" (Farrey, *ibid*). However, Amy also admitted an apprehension for having her future told to her at such an early age. To be told that one is not going to be an elite ballet dancer, could be psychologically traumatic.

International Sports Organisations

Presently, the two central, international sports organisations in respect of policy making are the International Olympic Committee (IOC) and the World Anti-Doping Agency (WADA). Currently, they have begun to create working groups to prepare for dealing with the problem of genetic modification, though to some disappointment, the presence of ethical research to inform these discussions is unclear. Central members of these organisations such as IOC President Jacques Rogge and IOC Medical Director Patrick Schamasch have expressed a concern for how genetics might be abused for sporting purposes. Rogge and Schamasch, both of whom are medical doctors, have already entered into the discourse of condemnation associated with likely abuses of genetics in sport. Importantly, their reaction derives from a perspective on abuse rather than use. This distinction is important, as it ought to allow for the possible applications of genetics as having ethical merits. However, any application sought within sport seems condemned by these two key persons within international sport. As Rogge states, "Genetic engineering in sport will foster not only a greater potential health risk for athletes than does conventional doping, but also a greater potential for performance enhancement" (cited in Longman, 2001, html).

Not surprisingly, there is a feeling in the International Olympic Committee for not wanting to be left behind, as has been the case for other kinds of doping technique. As Schamasch (cited in Longman, *ibid*) states, "for once, we want to be ahead, not behind".

Indeed, the statement of other key figures within international sport and medicine reinforces this sense of urgency. Prof. Arne Ljungqvist, IOC member and board member for WADA said that,

> The gene responsible for EPO has already been identified by the Human Genome Project and could, theoretically, be injected into the muscle. An EPO gene will promote the body's production of EPO and some people will say this can never be detected. There may be other parameters we could identify that tell us whether a person has injected this gene. (cited in Wallace, 2001).

Additionally, Professor Bengt Saltin of Sweden gave a paper at the conference titled 'Play the Game' held in Denmark (2001). Within this keynote speech, Saltin stated that the title for his paper, "Gene Doping: Science Fiction or Impending Reality?" might already "be outdated." Saltin continues to assert that,

> There is no doubt the medical technology is in place. Certain problems exist but they will be overcome. There are already possibilities for sportsmen. Within five years, commercial gene therapy will be available to everyone (cited in Walsh, 2000, html).

However, it is unclear whether this amount of time will be filled with the necessary philosophical and ethical consideration of the technology. Indeed, the depth of ethical issues that will arise from any kind of testing is of substantial concern. Even if the aspiration is to derive methods of testing for genetic modification, it is not clear that such procedures will be ethically sound and possible to apply. As Peter Schjerling, senior genetic researcher from Copenhagen, admits, "A doping test based on taking pieces of the athlete's muscle is not likely to be ethically accepted" (cited in Powell, 2001). Such a process would involve an invasive muscle biopsy for which no athlete is likely to provide consent. As Peter Hamlyn, consultant neurosurgeon at St Bartholomew's and the Royal London Hospital notes, "peeing in a pot is one thing, but having your legs cut open is another" (Hamlyn, 2001, html). Scherling continues to explain that,

> therefore gene doping can be arranged so that detection, in practice, will be impossible....Artificial genes can, and most likely will, be abused by athletes as a means of doping....Detection is extremely difficult since the artificial genes will

> produce proteins that are identical to those in the human body (cited in Powell, 2001, no page).

Some sympathy for the ethical and philosophical issues is found in the public statements of Theodore Friedmann, who questions the rationale behind genetic manipulation for sport. Friedmann asks,

> What are the endpoints of manipulation?...Is the hope to incrementally sneak up on the one-and-a-half-minute mile? Or six seconds for 100 meters? Is the question, How fully can we engineer the human body to do physically impossible things? If it is, what do you have at the end of that? Something that looks like a human, but is so engineered, so tuned, that its no longer going to do what the body is designed to do (cited in Longman, 2001, html).

Interestingly though, Jacques Rogge considers genetic screening to have merits in the application to sport, though draws the line at GM (Clarey, 2001a). While an explanation for this position is not clear, it seems to neglect the ethical concerns raised by genetic screening. For each of these institutions, the approach is already to condemn genetic technology in sport. Apart from Rogge's admission that genetic screening is ethically sound, there does not seem to be any acceptance that certain kinds of GM might be ethically justified. Yet, there is no real engagement with how medical ethics responds to applications of genetic technologies to techniques that are not strictly necessary. Thus, a response about the use of gene therapy to repair muscle tissue has not been given specific consideration. Statements tend to have been made in respect of the general issue of genetic modification in sport. On the basis of the present thesis, such an approach is simplistic and overly committed therefore. If it were deemed medically sound to use gene therapy to reduce the injury time of an athlete, then it would seem contradictory to retract the claims about genetics that have been made.

Importantly, there is a greater need for *precautionary statements* regarding the use of GM in sport though not just to their use, but also to their rejection. Certainly, there is some merit for ensuring that a message is clear and straightforward and, in the case of genetics, it might serve a better purpose to make such a message one of rejection and condemnation. For the IOC President to state publicly that some kinds of GM might be

acceptable would surely be harmful for ensuring that the abuse of GM does not take place. Yet, in so doing, international sports organisations must be careful not to simply retreat into ideological perspectives about what sport is and expect the perspective to be shared around the world. In the case of drug use, this does not seem to be the case. As well, in the case of GM, it is less likely to be the case because of the number of legitimate applications it can have.

By not entering into a public debate about the ethical issues in sport arising from GM, sports organisations are in danger of making similar mistakes as have arisen in respect of formulating policy about drug taking and doping. GM is not to be understood in the same way as other doping methods, because of its broader utility for medicine and society at large. Observing the way in which governments around the world are addressing the use of genetics in society more generally, there is a realisation that the problem of genetics is not temporary. It is not sufficient simply to reject its utility and condemn all kinds of applications. Rather, some kinds of GM will have great benefits for various kinds of people and are being legitimised by bioethical committees.

In order to develop a policy on the matter of GM in sport, it is important to consider what theoretical perspectives can be useful. Without any coherent theoretical basis for such discussion, it is useful to draw upon policy within sport and bioethics, which has been the ambition of the latter part of this thesis. Despite anti-doping policy departing from a biased perspetive – that doping is wrong and, as such, to be removed from sport – there are some merits that are worthy of attention, notably within recent developments. The ambitions for harmonization of an anti-doping policy are important, though seem also to omit the important consideration of what it is that is being harmonised. What seems to be missing from anti-doping campaigns is the philosophical and ethical groundwork that is necessary to inform the anti-doping argument.

This appeal for ethics to be valued by sports organisations does not aspire to some ideological aspiration for philosophers to be the gatekeepers of ethical decision making. To consider that the ethicist must, suddenly be used as a privileged source of knowledge is both unrealistic and inaccurate. However, the claim asserts that anti-doping is

fundamentally misconceived because it is overly generalistic. Arguably, there is not a sufficient definition of doping within sport that can yield a solution to the problem (which seems to be, how to remove cheaters from sport). Indeed, Barrie Houlihan (1999), one of the world's leading theorists on anti-doping policy, recognises that the absence of a clear definition leaves sports authorities reliant upon simple rule-violations as a basic rationale for developing anti-doping policy. However, this cannot continue. It is the very justification of rules – particularly new rules and new doping methods – that is under question. In respect of GM, the primary question is whether the enhancement should be against the rules at all.

Currently, Angela Schneider, former president of the International Association for the Philosophy of Sport and current Co-Chair of the Ethics and Education Committee of WADA has been involved with discussions concerning the revision of the Anti-Doping Code, the basic instrument for discriminating between different kinds of substances. Thus, the definitional work that is suggested as needing to precede harmonisation (or, at least, to accompany it), is being addressed within anti-doping meetings. A similar process must ensue for the analysis of GM in sport. However, it is also important that such discussions borrow from the format of deliberations about bioethics *outside* of sport.

GM in sport is not solely a sports issue in a similar way that it can be argued that drug use in sport is also *not* solely a sports issue. For the latter, the abuse of drugs is inextricable from the broader social concern about how drugs are used. Similarly, the use of GM in sport must be congruent with broader policy decisions in respect of genetics. Moreover, and perhaps more importantly, the *format for the discussions* about genetics must learn from how such discussions are taking place outside of sport. It is not sufficient for sports organisations to implement a working party that will exist for three or four years to formulate its anti-genetic policy. Issues and applications in genetics are not finite and, this thesis demonstrates the issues cannot rely only on generalised medical principles about what is ethical or not in sport, which is itself in continual redefinition.

6.2 *Considerations for a Policy on GM in Sport: Towards a Draft Statement*

For these reasons, the following tentative recommendations are given in respect of developing legal policy in respect of GM in sport, based upon the content of these conclusions.

1. The creation of a transnational ethical committee comprising expertise within sport and bioethics.

The format of this committee must, at least, reflect a similar composition of expertise that is found in other bioethical committees. The international status of any such committee must be in scope and in constitution. In recent years, the International Association of Bioethics has raised the profile of concerns arising from the dissemination of genetic research in developing countries. Between countries, there are important differences in relation to how the patient-doctor relationship is structured to empower the role of the doctor in varying ways. Conventional notions of informed consent, thus, might not suffice to ensure that decisions are made with the interests of the patient in mind. For this reason, and given the international status of elite sport, it is paramount that, within any sport/bioethics committee, there is awareness about the differing relationships between doctors, coaches, and athletes from different worldly perspectives.

The positioning of bioethical research and sports ethics is critical in respect of GM. The exclusion of either within a bioethics committee will be detrimental to the perspective of deriving coherent understanding about how genetics is best used in sport. Thus, the composition of a bioethics committee must encompass expertise from ethicists in sport and medicine, notably drawing upon emerging theoretical perspectives in bioethics that speak specifically to the ways in which genetics challenges the sanctity of medical ethical principles..

2. Negotiation of principles in relation to research and arguments found within the broader bioethics community.

It is important that a policy on the use of GM in sport is not stationary. Indeed, the very suggestion of formulating a single policy is misinformed. The arguments raised in this thesis

identify that there are a number of different applications of genetics to sport and that each raises different kinds of ethical issues. As such, it is important that any such policy differentiates between the different kinds of GM for sport and that it does not assert any prescribed ethical conclusion from its definition. Consequently, the concept of gene-doping or the creation of anti-gene-doping policy is to be avoided.

3. Continual investment into independent working parties and research.

The ethical issues arising from GM in sport are not fixed. As new forms of genetic technology arise, so too will new kinds of ethical issues arise for sports organisations to face. A prescriptive approach to GM in sport would thus, weaken the credibility of any such policy as being founded upon sound ethical deliberations. Research concerning the ethical status of GM must not be considered as a temporary or absolute measure. Where resources are limited, emphasis must be focused on drawing initial guidelines that can serve to lead to coherent policies and the possibility of implementing research funding for developing more sound policies. This does not eliminate the utility of working parties focused upon specific applications or particularly alarming developments in genetic science. However, such working parties should be seen as within a general and ongoing research committee in bioethics for sport.

4. Engagement of broader sports community in respect of whether specific kinds of GM in sport are unethical.

Issues arising from genetic technologies are not pertinent to only elite sportspersons. Rather, genetics is one of the few social issues that are of ethical concern for humanity in general. Additionally, sport is not the practice of an elite few, but concerns individuals beyond the sports organisations that are involved with making policy decisions. Given the broader social implications of genetic technologies and the multitude of interests within sport, it is paramount that policy decisions are preceded by an opportunity for open and public dialogue regarding its ethical status in sport.

5. Employment of modified precautionary principle.

Official statements concerning the use of GM in sport must be sensitive to the evolution of genetic technology. In many respects, there is a lack of consensus about the extent to which genetics should be used as a means of altering human beings. In the case of sport, where an insufficient amount of knowledge is known about the technology, and where the ethical conclusions do not allow for any clear conclusions, it is critical that a clear statement is made to this effect. The outright rejection of genetics without any sound ethical foundation is not justifiable and more likely to raise further problems in relation to harmonising policy. Clear statements about the uncertainty of the technology and the need to prevent its abuse are preferable to basing reactions upon unfounded appeals to ethical ideals.

6. Towards and Integrated Policy on Performance Enhancement.

Within the bioethical discussions concerning GM in sport it is also important to recognise that any such conclusions – if they are founded upon sports ethics – must endeavour to work towards a policy that recognises genetics as one of a number of technologies that are available to enhance performance. Currently, there is a lack of any consistency between different kinds of performance enhancements – not only between different kinds of drugs, but, for example, between drugs and sports equipment. In many cases the ethical arguments arising from GM can be made in respect of other kinds of technology in sport. Consequently, a general policy must depart from coherent statement about the kind of performance enhancement that is desirable in sport.

Importantly, the stipulations specified by this policy strategy do not inquire into the composition of bioethical advisory committee outside of sport. The aim here is not to problematise the notion of a bioethics committee, which would far exceed the ambitions of the current thesis. Rather, it is to assert that discussions within sports organisations about genetics must, at least, concur with discussions about genetics outside of sport.

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Notes

[1] For an in-depth overview of the historical context of artificial conception, see Challoner (1999).

[2] Numerous articles have detailed this story and it is important to realise how the occurrence affected the interest for anti-doping in Canada (the nation Ben Johnson was representing). Notably, the "Dubin Inquiry" (Dubin, 1990) that followed the Johnson incident, is a key document that reveals this impact.

[3] Kretchmar (1993, p.5) defines the distinction as ethics of means (deontological) and ethics of ends (consequential).

[4] Having said this, applied ethics is remarkable for its recognition that ethical issues are better informed by other disciplines. Where traditional theoretical ethics might shy away from acknowledging the value of sociology or biology to inform ethical discussions, applied ethics seeks to embrace such disciplines, arguing that there are fewer distinctions between disciplines than some would have it. Indeed, as some support for this in relation to the present thesis, Wright's (1999) provides an argument to conclude how philosophers and sociologists are not so different in their approach to studying the world.

[5] This point is particularly relevant to make within this methodology, as the thesis will deal extensively with the weaknesses within biomedical ethics that are revealed in the context of new genetics. While an attempt will be made to consider the broad, bioethical issues, it will be shown how traditionally accepted ethical principles within research cannot be applied in the context of this new technology. These conclusions lead to an approach that accepts moral principles must be adopted quite tentatively and, at most, only as a guide for beginning ethical inquiry. Upon accepting the relevance of ethical inquiry, it is now necessary to determine a methodological approach that befits the current dilemma.

[6] As such, the argument is in contrast with 'top-down' approaches to ethics in sport philosophy. For example, the application of rights theory to the treatment or animals, is argued as insufficient as it is the very justification of rights theory as a guiding ethical template that is in question.

[7] Although in a perfect simulation, it might seem an irrelevant difference.

[8] Perhaps the only conclusion that can be made is that there are varying levels of difficulty that a climb can have and that the level of difficulty achieved depends in part upon what technology is used. Indeed, this perspective is not so different from the

highly sophisticated way in which climbs are categorised by the difficulty of the route taken by the climber. In this sense, it can be said that the value of a climb increases with the level of difficulty that is achieved.

[9] The social significance of 'simple' technologies is considered in (Bijker, 1995).

[10] Indeed, Fairchild (1989) argues that some sports are valued particularly for their being risk taking pursuits such as, gliding (Carr, 1995).

[11] Presently, anti-doping codes conclude the latter – the policy of strict liability necessitates that no reason or excuse is heard for why an athlete has been found with a banned substance in their body. The very existence of the substance is sufficient to exclude the athlete from competition. This approach – pragmatic as it might be – does seem contrary to the interest in preserving ethical conduct, since it makes no account for the character of an athlete (see Houlihan, 1999, for further elaboration).

[12] Such consequentialist reasoning might require pursuing for it presumes an ethical view of genetic engineering on the basis of costs and benefits that might not be appropriate. For an overview of varying perspectives on approaches to bioethical dilemmas see Kuhse and Singer (1998).

[13] This presumes that any engineered person will have characteristics that are more advantageous than a non-engineered person. One might contest this with reference to Ledley's (1994) ideas about the environmental determinants of genetic advantage. Ledley identifies that seeming dysfunctional genes can simply be a matter of environmental circumstances. For example, the sickle-cell gene also carries a protection against malaria and the common cystic fibrosis mutation encodes a protein, which may function at low temperatures – an advantage in some countries.

[14] The concept of playability is not dissimilar to the concept of a 'sweet tension' described by Fraleigh (1984b) and later expanded upon by Loland (1998b).

[15] For an initial problematising of the internal and external goods within MacIntyre's thesis and in relation to sport, see McNamee (1995).

[16] This kind of application has been documented significantly in relation to the way in which insurance companies might exploit genetic information. It seems quite consensual that genetic information could provide knowledge about predispositions for genetically related conditions. By extension, such information might also indicate whether one is better to avoid specific kinds of physical activity. For example, genetic information might reveal that one has a predisposition for a muscular or bone disease of some sort that would make it quite dangerous to perform specific kinds of activity.

[17] It is important to note that Schneider and Butcher are dealing specifically with doping and that GM is not considered explicitly within their argument.

[18] For more details about the moral consideration of non-living entities see Elliott (1993).

[19] The authors referenced alongside the different harms provide a picture of where these arguments have been considered in some detail, rather than necessarily reflecting the central argument of the author. In many cases, the authors consider a variety of viewpoints in the analysis of arguments concerning doping, though it is useful as some form of guide to understand how interests have been focused.

[20] However, one might cite such sports as boxing, wrestling, or judo, where it *is* relevant to distinguish between genetic or biological characteristics to attain a more fair competition and promote different kinds of skills that are possible to display by virtue of having a different sized body.

[21] For references concerning the ethos of games and sport, see D'Agostino (1981), Morgan (1981), and Rosenberg (1995).

[22] For various references see articles in Collingridge (1980).

[23] A challenge more readily adopted by Butcher and Schneider (1998).

[24] Importantly, it is necessary to distinguish between the different kinds of rules that exist in sports, which perform different kinds of function, though an in-depth analysis of the function of rules will not be attempted here.

[25] One of the most recent controversies in respect of this issue has been the desire of a deaf lesbian couple, who sought to have a child who would also be deaf (Fickling, 2002).

[26] For a response to this 'slippery-slope argument, see Resnik (1994).

[27] It is interesting to note that Macer also acknowledges that, perhaps, the more determining factor for why such requirements were not maintained was the financial costs of the testing.

[28] However, it is important to remember that the use of tools is not defining of human identity, since there are examples of animals that can utilise natural objects and change their function to become a tool. For example, biological scientist Jane Goodall observed how a particular kind of chimpanzee would use leaves that were crushed together as a sponge to soak water out of tree stump hollows or use sticks to crack nuts.

[29] The rise of medical ethics and the later named, bioethics, is some indication of the significant issues raised about how society should construct humanness.

[30] This claim requires a clarification or typology of sports since, it would seem reasonable to claim that quantifiable results are more and less important for different kinds of

sport. For the present discussion, it is sufficient to consider that the analysis is limited to include those sports where the immediate applications of GM are useful. For such kinds of sports, quantifiable results are of some importance.

[31] It is relevant to note that it would seem that the infraction was an oversight. It was not clear that marijuana was on any prohibited substance list due to the unusual organisation of the snowboarding events. Rather than be under the auspices of a snowboarding federation, the International Skiing Federation adopted the role of organising the competition. However, unlike the snowboarding federation, the ISF included marijuana on their prohibited substances list thus rendering some confusion about its acceptability.

[32] For an overview of such arguments, particularly in relation to Peter Singer's work, see Wade (1996).

[33] Support for this kind of argument can be found in literature that discusses responsibilities towards environment (Elliott, 1993).

[34] Where possible, references include World Wide Web links to full-text readings to promote the accessibility of information. Where the link is no longer valid, a starting point for finding the online version can be to edit the website address and begin with the production organisation homepage. For example, Cogan (1998) includes the following address: <http://www.newscientist.com/ns/980523/nsport.html> However, if the specific page is no longer valid, then begin searching at the following site <http://www.newscientist.com> From here, use the search facility within New Scientists' pages. References are also given to print copies, where available.